FISHERIES EXHIBITION LONDON 1883

CATALOGUE OF INDIAN SECTION

DAY

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GREAT INTERNATIONAL

FISHERIES EXHIBITION,

LONDON, 1883.

CATALOGUE OF THE EXHIBITS

IN THE

INDIAN SECTION,

FRANCIS DAY, F.L.S.,

Deputy Surgeon-General, Commissioner for India.

LONDON.

1883.

00080033

PREFACE.

THE exhibits enumerated in this Catalogue include those received at the Great International Fisheries Exhibition in London, from the Presidencies of Bengal, Madras and Bombay (including Sind), as well as a few from private exhibitors.

Probably had a longer notice been given the representations of the fisheries of India would have been more extensive and complete, but considering the few months allowed for bringing the material together, great credit must be accorded to those officials in the East who worked with so much energy to render the Exhibition a success.

Dr. J. Anderson, F.R.S., of the Calcutta Museum, forwarded with the articles a printed descriptive list which gives many details and is included in the following pages. Also Dr. Bidie, of the Madras Central Museum, furnished a list of the exhibits from that Presidency. While Dr. McDonald, of the Victoria and Albert Museum, sent a full printed account not only of the articles from the collections made under his superintendence, but also of other interesting collections which he forwarded, especially from Mr. Sinclair, C.S., Mr. Wenden, District Engineer G. I. P. Railway, Poona (who likewise sent a separate printed list), and also Mr. Murray, of the Kurachi Museum, who with an extensive zoological collection likewise furnished a printed account.

The Secretary of State for India likewise authorized my exhibiting a private collection of Indian Fishes (in spirits), collected by myself, as illustrative of the varied descriptions found in the Indian Empire.

FRANCIS DAY.

INDIA.

Due to a separate hand-book having been published respecting the Fisheries of India, but few remarks on the subject are here required. That these sources of food supply in the fresh-waters are of great consequence to the people is shown by ascertaining what amount of the inhabitants would consume fish could they obtain it, and without any interference with caste prejudices or religious feelings.

In the Punjab comparatively but few of the inhabitants are thus prohibited, although Brahmans and the rural population in some places reject it, but among the residents of hilly districts and towns its consumption is only limited by the paucity of the supply and the cost of the article. In the North-West Provinces, Haiderabad, Mysor, and Coorg, more than half the population are permitted by their religion to consume fish. In Oudh the majority can do so. In Sind nearly all except the Brahmans; in Bombay by far the largest proportion of the people; in South Canara 89 per cent.; in Madras the majority, the exceptions being Brahmans, Goldsmiths, high-caste Sudras, the followers of Siva, Jains, etc.; in Orissa more than half the people; in Bengal proper from 90 to 95 per cent.; in Assam and Chittagong almost the entire population, and in Burma in the form of Nga-pee its use is universal.

The sea-board of India and Burma extends for about 4611 English miles, and the seas are much more abundantly stocked with fish than are those of Europe, consequently it appears strange why the majority of the sea-fishermen should be badly off, considering the almost unlimited inland market for fish which exists. A long investigation led to the conclusion that the fisheries were in a depressed condition wherever salt was expensive or the employment of untaxed salt-earth prohibited, as in Bombay, along the Coromandel coast of Madras and the Bay of Bengal. That they were

flourishing where salt was cheap or the use of untaxed salt-earth permitted, as in Sind, the Western coast of Madras and Burma. That where untaxed salt-earth could be obtained the superior quality of salt was rarely purchased for fish-curing. That (with the exception of Sind and Burma) where the use of salt-earth was prohibited, the fish-curer had to dry his fish in the sun, or purchase monopoly salt, while the sole way to keep down the cost of this latter description of cured fish was to pay the very lowest possible price for the fishermen's captures and employ a minimum amount of salt.

The Indian Government, acting upon this view, is now trying to lessen the cost of this condiment to the fish-curers. Thus along Madras, where during 1881 over 1700 tons of salt fish were prepared, in 1882 an increase of 400 tons was shown and more salting yards were being constructed.

The sea-fishermen pertain to the Sudras, a servile class among the Hindus, but there are also many who are either Mahomedans or Christians, more especially along the Western coast. They assert that in old times they were divided into two distinct classes, (1) those who plied their occupation in the deep sea or beyond their own depth, and consequently had to employ boats or rafts, and (2) such as fished in backwaters and creeks, or in the sea from the shore or by wading into the water.

The fresh-water fishermen are divisible into two main classes, (1) those who solely depend upon this occupation for the means of obtaining a livelihood, and (2) such as occasionally do so as subsidiary to other callings.

The Indian Collections are placed in the East Gallery, 60 ft. in length of which was first apportioned for them. This locality is situated between the portions devoted to the Straits Settlements and China. The amount of space was soon found to be too limited, consequently a further grant of room was asked for and 30 ft. obtained on the east side of the same gallery, between the collections of Hawaii and France, and here boats, nets and traps are shown.

The employment of the electric light having been permitted in this gallery, seriously tends to interfere with the due display of fishing nets, as the connecting wires are distributed all along the sides and top of the building which precludes such places being

utilized for the more immediate purposes of the Exhibition. Irrespective of which the illumination being by no means of great brilliancy, the exhibits under the pagodas are at night-time enveloped in great obscurity.

The mode of ornamenting the Indian Court was designed by Mr. Purdon Clarke, and is essentially Oriental in its character. Along the centre run two counters, each 7 ft. wide and 35 ft. long, separated from one another by the central promenade which is 10 ft. in width. The counters are each constructed in Indian Pagoda fashion, having a light raised canopy of calico which protects the exhibits from an excess of light descending from the glass roof of the gallery. Wide eaves of light wood projecting all round the upper margin of these pagodas not only afford shade to visitors, but are likewise utilized for the reception of large examples of porpoises, crocodiles, turtles, sharks, rays, skates and siluroid fishes. The decorative colours employed are ochre, Indian red and turquoise blue, while the pagoda spires are yellow.

The walls are coloured to correspond with the tone of colour used in the pagodas, while they are also as far as possible utilized for the display of some of the nets and fishing gear.

On reaching the Indian section, the first exhibits arrived at are contained in two glass cases, the one has a model representing the churning of the ocean, and which (see "Balfour's Encyclopædia of India") is considered to be typical of how the beverage of immortality was first produced. The ocean is represented as containing a number of its residents, in the centre of which is a turtle with a human head (an incarnation of Vishnu), which forms a rest for a pole which supports the sacred mountain (Mount Mandara), while passing round the pole or churning rod, as a thong, is the body of the five-headed serpent (Vasuki), one end of which is being held by fiends (Daitya or Asura), and the other by gods (Sura), who act as churners, and thus immortality, along with fourteen other precious gifts, were believed to have been obtained for man. There is also a model of a catamaran and various of the fishing castes. In the second case are models of a Bengal fish market, two Bombay fish stalls, and likewise one from Madras. Fishermen going to their work with a bamboo, on one end of which is slung a basket, at the other a cast net, while a contiguous figure represents the same individual, who, having arrived at the stream, has deposited his basket, and is about

to cast his net. Another figure shows how a triangular-shaped lave net is used in small watercourses or shallow waters. While various figures in as various costumes demonstrate how the fishermen, boatmen, fishwives, Parsees, East Indians, and others dress. There is likewise a model of a Madras masula, or surf boat.

Passing on to the counters, in front of and above the eaves of the left-hand pagoda is a fine stuffed sea-perch (*Serranus*) from Madras, upwards of 7 ft. in length, which forms an appropriate emblem of Indian fisheries, for in the East fish are held in great esteem, the order of the fish having been among the most coveted of the honours which the Emperors of Delhi bestowed. Similarly on the right-hand pagoda is a whip ray (*Trygon*).

The office which stands at the right-hand corner has a palm-tree appearing above its roof, while its front wall is adorned with a stuffed example of the bat ray (*Dicerobatis*) from Madras, which is upwards of 7 ft. across, also a young turtle. On the front wall is a Bombay crocodile nearly 10 ft. in length, while over the door is a smaller one of the same species and also a whip ray.

Along 40 ft. of wall space are placed a series of five wall cases, containing nearly a thousand specimens of fish in spirit, obtained from India and the East, and exhibited by Deputy Surgeon-General Francis Day.* They are only intended to be illustrative of the numerous sea, estuary, and fresh-water forms that people the waters of our Eastern dominions. Behind the bottles, and forming a background, are upwards of five hundred coloured illustrations of Indian fish and works descriptive of the collections. Among the forms exhibited are many of exceeding interest, some due to their rarity, others to their curious forms or still more wonderful instincts, while such as are important for human food are no less worthy of attention. Here may be seen the curiously long-snouted *Chelmon* or archer, which employs its snout as a blowpipe: when it sees an insect on a leaf or scudding above the water, it propels a drop of water through its long tubular snout, and is able to knock such down at least 3 ft. away. There is also the climbing perch of India, which progresses in a wonderful manner along moist grass, and owing to its amphibious respiration is able to live a long time when removed from its native element. Likewise many forms of the walking fish (*Ophiocephalus*) are exhibited, as well as the eggs of certain sheat

fishes (*Siluridæ*), the male of which carry the eggs in their mouths until the young are hatched. Likewise the various forms of air bladders of fishes, and which are used as coarse isinglass.

Between and above these cases are trophies of nets, fishing spears and traps.

Along the opposite or east wall runs a counter, the centre of which is occupied by a stand, on which are placed upwards of two hundred stuffed fish from the Bombay Presidency, collected at Poona or else off Bombay, some of the fresh-water ones are very rare, and others of the sea exceedingly interesting; while flanking these fishes are three large cases on either hand, containing a collection of fish-eating birds from Bombay. These were sent over as skins to this country, and have been stuffed and cased for the purpose of exhibiting at South Kensington. Above these cases are trophies of fish nets, traps and spears, while on the counter before them are materials for making nets, lines, boats, and artificial baits. Some of these are of a most primitive description, more especially the artificial flying fishes of the Laccadine Islanders.

Some twisted silk fishing lines of various thicknesses are displayed, along with which are shown the processes of preparation commencing at the cocoons of the tussah-silk moth, and how the raw silk is wound off; on testing one it was found to bear a strain of 14 lb., while the retail cost in India is about five yards for one penny. There is likewise a model from Bombay demonstrating how deep-sea stakes and nets are fixed.

On the left-hand pagoda counter are several cases of beautifully prepared crustacea from Madras, and likewise may be seen a pack of playing cards made from the scales of the *mahseer*. A model of the mode of spinning cotton is likewise present, and a representation of the thatched house in which fishermen reside. There is likewise a collection of shells and a series of the pearl oysters from Tuticorin, with a few seed pearls. Also a pretty little shade of two kingfishers, the bill of the lower one being imprisoned by the valves of a fresh-water mussel. This bird darted down into the dirty Coom river at Madras, expecting to capture one of the finny tribe, instead of which it got its lower jaw between the valves of one of the mussel tribe, which dragged it down and drowned it. There are also some very well executed models of Indian fish from Kishnaghar, among which the walking fish and climbing perch may be especially noticed.

The right-hand or eastern pagoda counter is more devoted to vertebrate forms, but with which some invertebrate spirit specimens have necessarily been included. Along a raised plank is a mounted series of well stuffed fish mostly from Madras (a few being from Bombay). In the centre is a fine example of the sword fish, while other forms are well worth examination, and are detailed in the Catalogue. Some very handsome fishes, also stuffed, are from Calcutta, noteworthy among them being a 46 lb. carp (*Catla*), and a fine barber's knife (*Notopterus*). Along a second and lower level is another plank, on which is a series of fish in spirit mostly from Kurâchi, also snakes, frogs, crustacea, mollusca, radiata, and other invertebrates. On the counter are to be found many modes in which fish or their products are prepared for the market in India and Sind, even examples of "nga-pee" from Burma are present.

In the portion of the Eastern Gallery where the extra exhibits are shown, or outside the building where the large boats have to be kept, may be seen illustrations of many of the ways in which fishing is carried on in the East.

First we find 'tidal fisheries' of a very primitive type, and which are formed by constructing pounds or enclosures into which fish enter with the flood, but are left impounded when the ebb takes place. From such place, the captures may have to be removed by scoop, lave, cast or other forms of nets. But it may be found necessary to raise a slight wall across the outlet, which is constructed of rough material, permitting the water to pass through but detaining the larger fish; or the same effect may be produced by inserting a trap at the outlet, which can be made of wicker work or even net. Advancing still further are wicker work labyrinths worked on the same impounding principle, and perhaps as these became insufficient to supply the wants of contiguous people, stake nets were constructed in suitable localities and on various plans, sometimes forming very elongated bag nets.

Another stationary form of net is the dip net, employed to this day in Malabar, and worked from a framework placed on the bank of a river where the tide ebbs and flows. In the Chinese Court are some very interesting advances upon this stationary form of dip net, one on the same principle is worked from a raft which can therefore be moored in any desired locality, or change its position if necessary: while in a second boat it is seen to be worked

from the top of a central mast, which itself plays in a basal socket; or going still further, a large fixed net may be seen capable of elevation or depression, being worked from a capstan which has ropes passing to each of the four bamboos to which its corners are secured. A step more and we find these dip nets altered by being fixed in bamboo or wooden frames and used as purse or lave nets, when they may be dragged or pushed up narrow pieces of water, or a row of fishermen can employ them in suitable places along the coast. If these purse or lave nets are removed from their frames and have their free extremities weighted by sinkers, we obtain a cast net, many forms of which are in the Indian collections, differing not only in the size of the net, but also in that of the mesh, while the sinkers may be of lead, iron, or burnt mud. These cast nets are occasionally joined together when it is desired to drag a piece of water which brings us to how 'drag nets' may have been first introduced as their necessity arose. Without enumerating all the nets, it may be mentioned that some have, others have not, floats, these floats consisting of wood, gourds, pith, cork, or other suitable substances. Some have a bamboo at either end, while there are a large array of purse nets and bag nets, some with, others without, pockets: some are for drifting, others for dragging, while a few are fixed. Irrespective of these there are special nets for various purposes, some being more complicated than others, while the size of the mesh is in accordance with the fish it is desired to capture.

A series of selected traps and cages may be seen on the counter of the extra exhibit space which are arranged in sequence so as to point out which appear to be the original and which modified forms. The most primitive is, perhaps, that constructed of a bell or cone shape, and made of various descriptions of wood fastened together by different materials. Both ends are open, the smallest one being above and merely of sufficient size for the fisherman to insert his hand and remove the captures. This is used in marshy or muddy localities for eels or murrul where it is pushed down among the fishes, or it may be employed by rows of fishermen each armed with one, and they will thus work a tideway and often with good results especially among grey mullet. In fresh-waters a somewhat similar cone is employed, but it is closed at its upper end which is lengthened with a handle for the right hand, while it has a loop of rope near its larger end to be held by the left hand, and in this way

it is employed as a scoop. A cone-shaped trap having a second inserted into its larger end may be used in a weir or watercourse by being laid flat for the water to pass through. Many modifications of this simple rat-trap principle are shown, and are chiefly used in irrigated localities where they are placed in smaller watercourses the majority being employed for capturing the fry of fishes, and, as a rule, are poaching implements which cannot be too highly condemned.

The Andamanese to this day use bows and arrows and spears for the capture of fish, and cross-bows for this purpose are also employed in various localities in India and Burma. Along the sides of the walls of the main exhibit are many forms of fishing rods, fish and turtle spears, some of the latter being barbed at their extremities others not so, while these barbed ends may be single or divisible into many points, the armed end being fixed to the strap or removable, but attached by a loose cord.

Boats and their models form rather an interesting series, and we find among those employed in fresh-waters the coracle, which is used in the Bowany River in the Madras Presidency. The model shown is 3 ft. in diameter, and composed of skin stretched over a bamboo framework. In Northern India and on the frontiers, especially towards Cashmere, Europeans are familiar with the untanned skins of animals being inflated and used as floats for the purpose of crossing rivers, but models of such appliances have not been forwarded, neither have any of the coracle-like boats of central India.

A very rough canoe, a dug-out or donga, 12 ft. 10 in. long, comes from Jessor. It is constructed of the stem of a palm-tree (*Borassus flabelliformis*), all the soft portion of which has been scooped out, leaving merely the hard outer layer.

In advance of the donga is the ekta of Patna, also a canoe or dug-out, 23 ft. long, constructed from the trunk of a semul-tree (*Bombax Malabaricum*), the bottom being flat both externally and internally, and at one end a small ridge has been left, simulating a rib.

The model of a Chittagong boat employed for capturing fish in shallows is exhibited. The common size used for fishing is about 24 ft. in length. This boat is fitted up with a broad bamboo platform on one side, fixed along the upper edge of the boat, and which passes downwards into the water. Behind this a bamboo projects

out of the water with a string of palm-leaves attached, forming a kind of broom. This frightens the fish, which jump upon the platform, one-half of which is submerged. From the platform they spring into the boat, the bottom of which is covered with branches of trees. When they spring into the boat they are prevented escaping over the other side by a net which is fixed either obliquely or perpendicularly along the opposite gunwale. The prow of the boat is kept depressed to the waters edge by being weighted with stones or sand. Modifications of this plan are extensively employed in Burma, especially for the capture of mullets in tideways, and shoals of small fish at the mouths of rivers entering estuaries. In the China section is a somewhat similar boat, but the platform is made of wood, painted white, and is found to be most successful during moonlight nights. The same method of taking mullets is said to be in use in portions of Siberia.

There are several models of Madras catamarans and one full-size outside the building. These rude-looking constructions are exceedingly useful for crossing the surf when such is impassable to ordinary boats. Constructed of from three to five planks lashed together by ropes, they form a raft. The prow is formed by wedge-shaped sharpened timbers, while it widens at the stern. It rides lightly on the sea, and rises to an ordinary surf, but is overwhelmed and rolled about by a great breaker, when the natives jump overboard, and again regain their vessel after passing the surf. During monsoons, when a sail can be put on them, a small outrigger is placed at the end of two poles as a balance, with a bamboo mast and yard, and a mat or cotton-cloth sail, all three portions being connected together, and when the tacks and sheets of the sail are let go it all falls fore and aft alongside. The natives who employ these boats are semi-amphibious in their habits, will dive down in the sea to forty feet or more to recover a lost rupee; while for a small sum they cross the surf to vessels, conveying in a pocket made of the areca palm, and tied round their waist, any communication from the land.

The surf, or Masula boats, of which there are some good representations, show how passengers are ordinarily conveyed ashore at Madras from passing vessels. They are broad, while their bottoms are flat, in order to permit them being beached, which is done at the third surf, when they are immediately dragged out of the water by the natives. The planks forming these boats are sewn together by

coir yarn, crossing the seams, which are also wadded with coir. This allows the various portions of the boat to yield to shocks, but precludes leakage.

The fishing boats of the Konkan are considered to be among the swiftest of the Indian sailing vessels. There are two excellent models on the scale of one inch to the foot, exhibited by Mr. McCann, Superintendent of the Bombay Coast Guard, and described in the Catalogue.

There are models of five boats from the Maldives and Aden, three of which appear to be rough representatives, probably the original form from which the machva of the Konkan are derived: while the remaining two have the planks sewn together as described for the masulah boat of Madras.

The live animals adverted to in the following Catalogue are deposited at the Zoological Gardens, Regent's Park.

FRANCIS DAY.

CLASSIFICATION.

The classification adopted is that made use of in the Official Catalogue, and which is described as follows :—

CLASS I.—FISHING.

SECTION I.—SEA FISHING.

Div. 1.— 1. Gear of every Description and of all Nations used in Trawl, Herring, Long Line, Hand Line, and every other Mode or System of Fishing, including all Nets, Lines, Hooks, Harpoons, Tackle, etc., employed in the same.

Div. 2.— 2. Oyster Dredges, Crab, Lobster, Prawn, etc., Pots, and other Appliances for catching Fish of this Description.

3. Fishing Craft of all Nations; Models and Representations of the same.

Div. 3.— i. Steam Fishing Vessels and Steam Carriers.

Div. 4.— ii. Fishing Vessels and Boats other than Steam Vessels.

Div. 5.— 4. Ropes and Canvas suitable to Fishing Vessels.

Div. 6.— 5. Steam and Hand Capstans, Compasses, Barometers, Telescopes, Lights, Lamps, Fog Horns, Systems of Signalling at Night for Fishing Fleets and Vessels, Electric Lights, Luminous Paint, and other Equipment of Fishing Vessels, Charts for Fishermen.

Div. 7.— 6. Models of Harbours, Piers and Slips, for Fishing purposes.

Div. 8.— 7. Fishing Tackle and Netting in different Stages of Preparation, Machinery used for working up the Raw Material.

Div. 9.— 8. Life Boats, their Equipment, and Life-saving Apparatus of every Description.

Div. 10.— 9. Appliances and Methods for Breaking the Force of the Sea at the entrance of Harbours and elsewhere.

Div. 11.—10. Methods of Communication from the Shore to Lightships and Fishing Fleets by Submarine Cables, Telephone or other Means of Signalling.

Div. 12.—11. Methods of protecting Submarine Cables from Injury by Fishing Operations (illustrated by Models and Drawings).

SECTION II.—FRESH-WATER FISHING.

Div. 13.— 1. Salmon Nets and Fixed Appliances for catching Salmonidæ in all their Varieties.

Div. 14.— 2. Salmon Rods, Reels, Lines, Artificial Flies and Baits, Gaffs, Spears, Creels, etc.

Div. 15.— 3. Trout Rods, Reels, Landing Nets, Lines, Artificial Flies, Baits, Baskets, Bags, etc.

Div. 16.— 4. Pike, Barbel, and other Coarse-Fish Rods, Reels and Tackle, Artificial Spinning Baits, etc.

Div. 17.— 5. Traps, Nets, Bucks, Wheels, and all kinds of Apparatus for catching Eels, Lampreys, etc.

Div. 18.— 6. Hooks, etc.

Div. 19.— 7. Anglers' Apparel of every description.

Div. 20.— 8. Boats, Punts, Cobles, collapsible, portable, etc. in Models or otherwise.

NOTE.—*The above classification is suggested as a convenient one for this class, but it is not intended to exclude any objects which come within the class.*

CLASS II.—ECONOMIC CONDITION OF FISHERMEN.

Div. 21.—1. Apparel and Personal Equipment.
Div. 22.—2. Food and Medicine Chests.
Div. 23.—3. Models and Plans of Dwellings.
Div. 24.—4. Contracts of Partnerships; Insurances of Life, Boats, Gear, etc.; Benefit Societies.

CLASS III.—COMMERCIAL AND ECONOMIC.

1. Preparation, Preservation, and Utilization of Fish, and all Forms of Life included in Class V.

(*a*) For edible purposes—

Div. 25.— i. Models of fish-curing establishments. Methods of, and models and other representations of any appliances for, drying, curing, salting, smoking, tinning, cooking, etc.
Div. 26.— ii. Fish dried, smoked, cured, salted, tinned, or otherwise prepared for food.
Div. 27.— iii. All products prepared from fish, such as oils, roes, isinglass, etc.
Div. 28.— iv. Antiseptics suitable for preserving fish for food.

(*b*) For other than edible purposes—

Div. 29.— i. Oils, manures, and other products prepared from fish.
Div. 30.— ii. Methods of, and models, and other representations of appliances for, preparing oils and manures from fish.
Div. 31.— iii. Sea and fresh-water pearl shells; mother-of-pearl manufactured; pearls sorted.
Div. 32.— iv. Preparation and application of sponges, corals, pearls, shells, and all parts and products of aquatic animals, etc., to purposes useful and ornamental, with specimens.

2. Transport and Sale of Fish.

Div. 33.— (*a*) Appliances for carrying fish and for preserving fish during transport or otherwise, and models of the same.
Div. 34.— (*b*) Models of fish markets, and appliances connected with the same.

CLASS IV.—FISH CULTURE.

Div. 35.—1. Models or Drawings of Fish Hatching, Breeding and Rearing Establishments, including Oyster and other Shell-fish Grounds; and all Apparatus and Implements connected with the same, and for transporting Fish and Fish Ova. Food for Fry.
Div. 36.—2. Representations illustrative of the Development and Progressive Growth of Fish.
Div. 37.—3. Models and Drawings of Fish Passes and Fish Ladders.
4. Scientific Investigation.
Div. 38.— i. Models and drawing of diseases of fish, with special reference to their origin and cure.

Div. 39.— ii. Processes for rendering streams polluted by sewage and chemical or other works innocuous to fish life (illustrated by models and drawings).

Div. 40.— iii. Physico-chemical investigation into those qualities of salt and fresh-water which affect aquatic animals; investigation of the bottom of the sea and of lakes, shown by samples; aquatic plants in relation to fishing, etc.; researches into the aquatic fauna (animals of the several classes, preserved in alcohol or prepared, etc.); apparatus and implements used in such researches.

Div. 41.—5. Acclimatization of Fish.

CLASS V.—NATURAL HISTORY.

[AQUARIA.]

1. Specimens, Living (Marine and Fresh-Water), Fresh Stuffed or Preserved, Casts, Drawings, and Representations of—

Div. 42.— (*a*) Algæ to be arranged under genera and species with localities appended.

Div. 43.— (*b*) Sponges, in their natural state.

Div. 44.— (*c*) Corals, in their natural state, polyps, jelly-fish, etc.

Div. 45.— (*d*) Entozoa and epizoa.

Div. 46.— (*e*) Mollusca of all kinds and shells not included in Class III.

Div. 47.— (*f*) Star-fishes, sea-urchins, holothuriæ.

Div. 48.— (*g*) Worms used for bait, or noxious; leeches, etc.

Div. 49.— (*h*) Perfect insects and larvæ of insects which are destroyers of spawn, or serve as food for fish.

Div. 50.— (*i*) Crustacea of all kinds.

Div. 51.— (*k*) Fish of all kinds.

Div. 52.— (*l*) Reptiles, such as tortoises, turtles, terrapins, lizards, serpents, frogs, newts, etc.

Div. 53.— (*m*) Aquatic and other birds hostile to fish or fishing.

Div. 54.— (*n*) Aquatic and amphibious mammalia (otters, seals, whales, etc.) and others detrimental to fish.

Div. 55.—2. Works on Ichthyology. Maps illustrating Geographical Distribution, Migration, etc., of Fishes and Spawn.

Div. 56.—3. Specimens and Representations illustrative of the Relations between Extinct and Existing Fishes.

CLASS VI.—HISTORY AND LITERATURE OF FISHING—FISHERY LAWS—FISH COMMERCE.

Div. 57.—1. Ancient Fishing Implements or their Reproductions—Models—Pictures—Books—Emblems—Charters and Seals of Ancient Fishermen Guilds.

Div. 58.—2. Fishery Laws of Different Countries.

Div. 59.—3. Copies of Treaties, Conventions, etc., dealing with International Fishery Relations.

Div. 60.—4. Reports, Statistics and Literature of Fish, Fishing, and Fisheries.

Div. 61.—5. Reports on Acclimatization of Fish, and of Attempts in the Direction.

BENGAL.

Dr. Anderson observes that the exhibits were brought together very hurriedly, and only reached Calcutta in time to be rapidly described before being packed for despatch to England.

They are not so representative of the fisheries of Bengal as doubtless would have been the case had more time been available, and, moreover, some of the districts, owing to their remoteness from Calcutta, are unfortunately unrepresented.

The descriptions have been drawn up under considerable difficulties, because the district officers had not time given them, in many instances, to accompany their exhibits with sufficient details regarding their methods of use. To supplement this deficiency a fisherman was sent along with the specimens from some of the districts to explain and to show their uses, and it is mainly from the information gained in this way that this Catalogue has been compiled.

DIVISION I.

The numbers, as far as possible, refer to the Official Catalogue of the Exhibition, but where there are two numbers the one in brackets agrees with that in the Official Catalogue.

NETS WITH FLOATS.

a.—Without sinkers.

1 *Teār.*—A net 227′ long and 1′ 6″ deep, with a mesh of 4″. It is suspended to a cord of its own length (227′), to which 142 reed floats 2″·50 long are attached at intervals of 16″. This net is used for catching *Labeo rohita* in large tanks or in still water. It is paid

out from a boat, and three floats are gathered together and dropped at one time into the water, the object being to entangle the fish in more than one mesh. The net sinks for some depth under the water, generally resting on the bed of weeds growing in the bottom of the tank. *Ruee* (*Labeo rohita*) up to half a maund in weight are caught in this net.

This net is from Motīhāri, Champāran.

2 A fine floating net like the *teār*, made of cotton thread and with a mesh of 0″·75, and with grass floats. It measures 8′ 5″ long and 1′ 8″ broad. It is used generally in lengths of over 100′, and 3′ to 4′ in depth, and is allowed to drift on a gentle current. Mullet and other fish get entangled in the meshes.

It is called *bata jāl* in Chittagong.

3 This net is similar to the *teār* of Champāraṇ.

Its length is 150′, depth 8′ 4″, mesh 6″. The floats are of grass, and are at intervals of 20″, two placed together, each float being 6″·50 long. It has a float at each end of bamboo* or of *shola*, and is used either in still or running water.

It is paid out across the stream from a boat, and any kind of large fish is caught in it.

4 Another similar, measuring 92′ by 8′.

5 Another similar, measuring 328′ long by 4′ 8″ deep, mesh 5″.

These nets are from Murshidabad, where they are known as *sarki* or *pakhi*.

6 This is a net of the same nature as the *teār* and *sarki* and *pakhi*. It measures 61′ by 13′, and is made of cotton twist, and the mesh is 2″·50. It is supported by *shola* floats, and is used in still and in running water. In the latter, in which it is seldom or never used if it is more than waist deep, the net, as it is carried away by the stream, is followed by the fishermen, but in still water they manipulate it from small rafts made of *shola*.

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* The bamboo mostly used in Bengal, according to Dr. King, is *Bambusa balcoola*, Roxb.

This net is called *dhani* or *dholi jāl* in Nadiyā, in allusion to its whiteness, as it is never steeped in cutch or *gab*.

7 A net corresponding to the *teār* of Champāran, throaded on cord 86′ 9″; the length of the net, when stretched along its free lower border, being 171′, with a depth of 12′ and with a triangular mesh of 8″ to 9″. It is tied at intervals corresponding to five sides of a mesh, as this has been found by experience to be the most suitable length to give it, and the measure is therefore at hand when the net is tied on. Each net must have three floats either of *shola* or bamboo, one at each end, and another float at the middle attached to the end of a long cord. The net is paid out from the boat, and after this has been done, the middle float is taken up and the cord attached to it is pulled in sufficiently so that the fisherman can be made aware, when holding it, if a fish is in either end of the net. He generally sits across the bow of his boat with the float lying beside him, and if he feels that a fish is in either side of the net, he lets go the string and float and pulls in the end in which the fish is, using a landing net to take it into the boat.

These nets are frequently tied together and used in great lengths, and in this case the string and float are in the middle of the compound nets.

This net is used only at nights, and from October to the middle of June, when the current is not strong. Large fish, such as *Labeo rohita* and *Catla buchanani* are caught in it.

It is called *dakon jāl* in Nadiyā.

8 *Audola.*—A net like the *teār*, made of cotton, and with a mesh of 0″·75, 142′ long, and 3′ broad or deep. A cord is run through the upper and lower borders, and the former is provided with numerous reed floats.

This, according to the description that accompanied it, is a sheet net, varying in size, and is thus used:—The fisherman, holding a cord at one end, throws the net into the stream. The floats attached to the top sustain one edge of the net above the surface of the water, the other end being held down with the foot.

The power of the current stretches out the net to its full length, and it forms a sort of screen in the water which prevents the escape of the fish. The fisherman, as soon as he sees any fish near the

screen, wades up to them and captures them with a bag net, *garna* (one accompanies the net), which he holds in his hand for that purpose. Occasionally two men are employed in the use of the net, one at each end, one of the two remaining stationary while the other wades out into the stream, and when the net has been stretched out to its full length returns to the shore. The net forms a semi-circular enclosure, the fish penned up in which are taken with the hand net.

This is called *audola* in Cuttack.

9 *Pash Jāl.*—This is a small net of the same principle as the *teār*, measuring 15′ 6″ long and 2′ deep, and with a mesh of 1″·75. It is made of cotton cord soaked in *gab*, and has sixteen reed floats 2″·50 long, at intervals of 9″.

It is used for catching small *Labeo rohita, Catla buchanani, Cirrhina mrigala, etc.*

It is called *pash jāl,* or side-net in the Nadiyā district.

10 *Kabai Jāl.*—A net 35′ long, 1′ 4″ deep, and with a mesh of 1″. It is of the same character as the *teār* of Champāran, but as it is made merely of cotton twist, it can only be used in still water and for small fish. It has forty-four fine bamboo floats.

At Noākhāli it is called the *kabai jāl.*

11 A portion of a floating net, measuring 7′ 6″ long × 6′ 9″ deep, with a mesh of 1″. It has five cylindrical wooden floats.

It is called *shooli jāl* or *vasha jāl* in Chittagong, and it is drawn from a boat and is used in large rivers.

12 Portion of a large floating net, 18′ 3″ long, 5′ 7″ deep, and with a mesh of 1″·50. It has some wooden floats, and is made of strong cord. It is generally used in lengths of 200 yards and 10 yards deep.

At Chittagong it is called *dokhanda.*

13 A net 460′ in length, 9′ deep, and strung above and below on to a strong rope. Gourd floats occur at intervals of 26′. The mesh is 9″, and is used for catching *gochta* fish, a large carnivorous fish

found in the northern rivers of Behar and that prefers the colder waters from the Himalayas.

The net is known as the *guchel* in Patna.

14 A float net 500′ long, 3′ 4″ deep, and with a mesh of 4″. It is made of hemp, and has reed floats 4″ long and 1′ 2″ apart, and a gourd at either end.

It is called *tewar* in Patna.

b.—With sinkers.

15 *Kai Jāl.*—A net of the same character as the *teār* of Champāran, but with six sinkers of broken earthenware formed into discs, and with twenty floats made of cane and doubled, each float measuring 3″·50. The net is 34′ long and 2′ 6″ deep, and with a mesh of 1″·25. It is made of cotton prepared with the juice of *Diospyros embryopteris*, and it is chiefly used for netting the *koee* fish, *Anabas scandens*, and young specimens of *Labeo rohita*.

In Jessor it is known as the *kai jāl*.

16 A floating net of the same nature as the *teār*, measuring 127′ long and 3′ 2″ deep, with a mesh of 1″·50. It is provided with eighty-seven reed floats and 277 earthen sinkers. A gourd is attached as a float to one end of the rope, on which the net is strung. In the account that accompanied this net it is stated that "one man holds each end and drags the net, allowing the lower side of it to touch the ground."

It is used for catching large fish in the Son River, and is called *arrahia* in the Gya district.

17 Part of a weighted drag net with three long bamboo floats. It measures 10′ 3″ long by 3′ deep. It is made of strong cord, and has a mesh of 1″. It is usually made 50 yards long and 6 yards broad.

It is known at Chittagong as *ber jāl*.

18 *Dewra.*—A drag net with a mesh of 1″, and measuring 50′ by 24′. A strong rope of jute is run through the upper and lower borders of the net, *shola* floats being attached to the upper, and weights, usually stones or bricks, to the lower border. A rope is fixed to each end above and below, and the fishermen on either side of the tank, in

hich these nets are used, drag it from one end to the other. If the ɔttom of the tank happen to be covered with weeds, the net is apt ı roll up and so prove useless. The fish caught are those generally ınd in tanks, viz., *Labeo rohita, Catla buchanani, Notopterus chitala, Notopterus kapirat, Cirrhina mrigala, Labeo calbasu, etc., etc.*

In Nadiyā this net is called *dowra jāl.*

19 Part of a drag net and measuring 20′ × 20′ with cylindrical earthen sinkers and gourd floats, and with a mesh of 1″·75. It is used for dragging tanks and still water, and is generally made in sections that are tied together as they are required.

At Patna this net is called *pounree,* and it is the equivalent of the *dowra jāl* of Nadiyā.

20 Part of a net like the *pounree* and *dowra,* but with a finer mesh than the former and with *shola* floats. Size 16′ × 18′, mesh 0″·75.

It is called *ghunny jāl* in Patna, and is generally made in lengths of 1000′, and is used for dragging bheels.

21 *Kachal.*—A hempen net with a mesh of 1″·50, and measuring 49′ deep by 92′ in length. It has twenty-eight floats made of the wood of *Excœcaria agallocha,* Wild.* measuring 17″ long and 1″·50 in thickness, and tied at both ends to the rope that runs along the upper border of the net. The lower border is generally weighted with stones or bricks, and it is the first part that is let into the water. After it the floats are paid out, beginning at one side and proceeding to the other, the corner that is first let out having a light weight attached to it for the purpose of steadying but not anchoring it. The net is allowed to drift for one or two hours, after which the corner first let out is pulled up along with about one-half of the depth of the net at that part, but not the whole, as the fish are only found in the upper half. As a fish is seen a landing net is introduced below the net, and the fish forced into it.

This net is chiefly used in deep rivers for the capture of *hilsa, Clupea ilisha,* one of the *Clupeidæ* (herrings), and famous for the rich flavour of its flesh. It frequents estuaries and ascends rivers for the purpose of spawning.

In Nadiyā this net is known as the *kachal jāl.*

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* I am indebted to Dr. King for this identification of this wood.

22 A net 99′ long, 20′ deep, with a mesh of 1″·25, and made of strong cord. There are seventeen *shola* floats along the upper border. It appears to be a drag net, and it is probably weighted at its lower border when in use. The description that accompanied it gives the following account of its use:—"This is generally used in deep water. Two ends are held by a man who stands on the shore, one end being attached to his foot by a loop and the other end being held up with one of his hands. The net is then placed in a boat, which runs into the stream, making a circuit. The net is gradually dropped into the water, the other ends being retained by a man in the boat. On the return of the boat to the shore the ends of the net are hauled in, and whatever fish there may be within its folds are drawn ashore. This net is used chiefly to take the larger sorts of fish, and it is rather troublesome to manage."

It is called *hatula* Cuttack.

23 A net similar to the last, but made of fine cotton thread and with a mesh of 0″·25. It measures 90′ long and 17′ deep. The upper border is provided with seventy-eight floats of *Excœcaria agallocha*, of triangular form, and fastened by the cord of the upper border being passed through them. It is described by Mr. Jones, the Collector of Cuttack, as being used in shallow water, and the meshes being smaller than in the *hatula jāl*, it serves the purpose of catching smaller fish.

It is known as *pagie jāl* in Cuttack.

DRAG NETS WITH POCKETS.

24 A drag net 13′ deep and 19′ long with a mesh of 1″. As usual, it is strung on to a strong rope, to which it is tied, and which has two cylindrical wooden floats, the largest 11″ long and 6″ in diameter, and the ends of the rope are prolonged about a foot or two beyond each side of the net. It has two lines of sinkers, the first occurring about 10″ from the upper margin and forming a longitudinal screen along the middle of a series of pockets 15″ deep. The second line of sinkers occurs 9″ below these pockets, the weights being arranged along the mouths of another series of pockets also 15″ deep. The sides of the net are also more or less weighted. A rope 26′ long sent along with the net had pieces of

palm leaf passed through the strands at intervals. The following description accompanied the net:—

"It is stretched on a rope with the two ends prolonged, according to the breadth of the water. To the rope palm leaves are tied which, twisting round the ropes, frighten the fish into the net. Some heavy substance, such as stones or bricks, is tied at proper distances on the lengthened ropes to sink them and steady the net under water."

The net, however, is probably a combination of the *chounti jāl* of Patna, and the *chanda* of Nadiyā, so far as the rope for frightening in the fish is concerned. It is called *balar* in Gya.

25 A net dragged by two men along the beds of streams. It is 11′ 6″ in length with a total depth of 5′ 5″. It is strung on a rope along its upper margin, to which some gourd floats are tied, and at 2′ 8″ from the rope there is a narrow secondary mesh-work of net attached along its length for the reception of small pieces of stone acting as weights on this part of the net. On the under surface, 3′ 4″ from the upper border, there is a longitudinal line of iron sinkers strung together and suspended by cords 6″ in length, and from this line of sinkers there is a further continuation of the net about 2′ deep, passing backwards over the upper surface of the net and enveloping the upper attachment of the iron sinkers for about 6″. It thus forms a pocket the whole length of the net, and the entrance to it is between the cords that suspend the line of iron sinkers. There is an interval of 10″ between the two lines of sinkers. While in use, the iron sinkers are dragged along the bed of the stream with the pocket behind them, and kept open by the action of the current, as it is used against the stream; at the same time the upper part of the net is kept tight by the other line of sinkers above and by the lateral traction exercised by the men working the net. The upper portion thus forms an effectual screen preventing the escape of the fish and directing them downwards to the pocket behind the iron sinkers.

It is used only to catch ground fish, and, in Patna, it is known as the *chounti jāl.*

26 A wedge-shaped net with a convex border for its base, the apex ending in a point to which a rope is attached. The total length of

the net, in a straight line from the apex to the centre of the base, is 50′, and the breadth across the latter is 37′. The broad part is paid out first, from side to side, the boat being propelled outwards as this part of the net is let into the water. After this, the remainder of the net is then let out as far as the rope attached to the apex, which is secured in the boat. At the broad end or base the net is turned round on itself for 2′ 6″, and tied at regular intervals to its under surface; the intervening portion being weighted with sinkers, a series of pockets is produced when the net is drawn into the boat, and it is in these pockets that the fish are netted. The mesh is 3″·56.

This net is used for catching large fish, such as *Labeo rohita* and *Catla buchanani*.

It is made of hemp, and is called *buchur* in the Nadiyā district.

27 A model of a drag net. The net is attached to a bow-like bamboo, which may be 7′ long. In the model the bamboo is 4′ long and the net is 1′ 10″ in depth; the lower 6″ double and forming a pocket the breadth of the net, the free margin of the pocket being weighted. A weight is attached to each end of the bamboo, and, by a cord at its middle, it is pulled along the bottom like a dredge.

It is called *mai jāl* in Chittagong.

28 A net made of cotton thread, with a mesh of 0″·50, a length of 141′ 6″, and a depth of 5′ 10″. The net is threaded on a cord of its own length and on either extremity of which is a sharp-pointed piece of bamboo 11″ long. Six inches of the net below the cord have a mesh of 1″, and the lower six inches, being folded over on itself, a series of pockets is formed, along the mouths of which runs a continuous line of sinkers, little beads made of blue clay. Triangular floats made of the light wood of *Excœcaria agallocha* are strung on to the upper cord at regular intervals.

This net is used by two men to catch fish in shallow water, one holding one end remains stationary, while the other, taking with him the other end, wades out into the stream. The weights near the edge of the net sink it to the bottom, and the net acts as a screen to prevent the escape of fish. It is then drawn gradually towards the shore, and the fish in the enclosed space, finding no means of escape, go to the bottom, and getting into the pockets are unable to

extricate themselves, and, the net being drawn in, the fish are found in the pockets.

It is called *ghai* in Cuttack.

SHORE NETS.

29 *Chella Jāl.*—A net with a mesh of 0″·40 and resembling a large hammock in form, the two sides being of unequal length, one measuring 65′ and the other 68′, the latter having fifty-nine floats of *pur* wood attached to it, each float being 9″·50 in length. The two sides of the net are connected at each end by a cross piece of bamboo 21″ in length. A man stands on the bank holding one end whilst a boat manned by three fishermen pulls out from the shore describing nearly a semi-circle, paying out the net as they go, returning with their end of the net, and when the shore is neared the fisherman paying out the net jumps into the water and makes over his end to the shoreman, and thus a loop is formed. As the man on the shore receives the second cross stick he reverses the position of both of the cross sticks, so that the floated side of the net is brought downwards to the other and lower side. The other man, who is standing within the loop, at once grasps the floated and non-floated borders of the net, bringing the inner sides of the loop together, and as he does so the man on the land draws the net towards him in a heap, and, when it is nearly all pulled in, it is lifted on to the boat and the fish in the net are then shaken out into it.

All kinds of fish may be taken in this net, which in the Jessor district is known as the *chella jāl.*

30 A net 12′ long, and 4′ 10″ to 6′ broad, stretched in its breadth between a bamboo at either end. Two men are required to work the net, one at either bamboo, holding the bamboo handle, one end of which with the corresponding side of the net is turned downwards almost scraping the bed of the stream, the men keeping the net stretched between them or nearly so. They walk—almost run—with it, bending down through the water up to the middle, and, having progressed some distance, one man turns his bamboo one way, and the other in a reverse direction, so that the net is crossed at the centre, and the fish are enveloped in a fold of the net on each side.

Large fish such as *Catla buchanani, Labeo rohita, Cirrhina mrigala, Wallago attu,* and *Macrones aor* are caught in it.

It is called the *dah jāl* in Muzaffarpur.

31 A net 35′ long, 1′ 10″ deep, and with a mesh of 0″·50. It is used for catching small fish, and its use is thus described:—

"One man holds one end of the net, the other keeping on the land, he then runs into the water where shoals of small fish are found, and surrounds them with it. After this another man splashes the water and frightens the fish into the net."

It is used for catching small fish, and is called *tengri* in Gayā.

32 A bag net made of cotton, and with a mesh of 0″·75. The mouth is 5′ 10″ long and 1′ 7″ broad, and the net is 3′ deep. The mouth is kept open at the ends by a cross bamboo 1′ 9″ long, to which the cord on which the net is strung is attached. This net is used by two boys, and is held with the mouth against the stream, one side scraping along the bottom. Small fish and prawns are netted in it.

It is called *dhouri jāl* in Patna.

33 *Kāti Jāl.*—A narrow net 22′ 9″ long and 2′ deep, closed below, where there are series of small pockets all along its length, but open at the ends; the sides are kept apart by cross pieces or sticks, twenty in number and 1′ in length. Besides these there are four short sticks attached to each side of the net, the first pair from each end occurring after the sixth transverse pair and the second after the ninth. The first six pairs of transverse sticks are at intervals of about 10″.

It is known as the *kati* at Noākhāli.

34 A net resembling the *kati* of Noākhāli.

It is known at Puri also as the *kathi,* where it is used in fresh-water fishing.

Without pockets.

35 A net resembling the *kati* of Noākhāli, but without pockets. It is 52′ 10″ long, 2′ wide, and 1′ deep. The sides are kept apart by twenty-five pieces of cross bamboo, and there is a wooden handle at

each end, the mesh is 1″. This net was not accompanied by any description of its use beyond that it is used for the sea beach. It is evidently worked by two men notwithstanding its length, and it is very light.

From Puri.

36 A net resembling the *kāti jāl* of Noākhāli, but without pockets and with only seven cross sticks, five of which keep the net open and two are end ones. The net measures 13′ long and 20″ broad with a depth of about 10″.

It is used in shallow water, one man holding each terminal cross-rod perpendicularly in the water, the net being drawn slowly towards the shore. The fish are shaken out into baskets.

It is called *kharee jāl* in Cuttack.

CASTING SHORE NETS.

With or without small pockets around margin.

37 A conical net 15′ long, the mouth when expanded having a diameter of 38′. A few inches of the mouth of the net, in some forms, are turned inwards and fastened at intervals, thus producing a series of pockets, the inner margins of which are weighted at intervals with iron sinkers, forming a continuous series all round the inner surface of the aperture of the net. A cord 20′ long is tied to the apex of the net, and a loop at its end is thrown round the third and fourth fingers, the remainder of the cord and all the net, with the exception of four feet or so, being gathered up into loops in the right hand. After this has been done, the mouth is opened by the fisherman catching up one part of the dependent free border and throwing it over the loops held in his right hand. He then sorts out the whole of the portion hanging down, commencing at the left side of the opened mouth, and passes the folds over on to his left fore-arm. The right hand, grasping the folds resting on it, it is then turned right round, so that the palm is directed outwards to the right, and, at this stage, both arms are held out nearly at right angles to the body. Both arms are then raised until the hands are brought on a level with the right side of the head, when the net is forcibly and dexterously thrown forwards to the left over the water, the mouth expanding into a circle as it

falls. The mouth then sinks, and when it has sufficiently done so, the net is pulled in by the cord, and the margins of the mouth and the pockets closing in as they are dragged over the bottom prevent the escape of the fish.

The net is called *khep* in Motīhāri.

38 Another net, the same as the *khep* of the Champāran district, and known in Nadiyā as *khepla*, which may be interpreted as meaning that which is thrown down; but in Bengali it is called the net that is swung round the head—an appropriate term to apply to it.

From Nadiyā.

39 A casting net like the *khepla* of Nadiyā, and measuring 18′ in diameter.

At Patna this form of net is called *khopial*.

40 A casting net made of fine cord and measuring 7′ 8″ in diameter at the mouth, and with a mesh of 1″.

It is called *chatki jāl* in Chittagong.

41 A casting net made of strong cord, and measuring in diameter 6′ 7″, and with a mesh of 1″·50.

It is called *dohon jāl* in Chittagong.

42 A cotton casting net like the *khepla*, 6′ 2″ in diameter at its mouth, and with a mesh of 1″.

It is called *jhaki jāl* in Chittagong.

43 A casting net like the *khepla jāl*, but without pockets at the margin, around which there is a line of cylindrical clay sinkers. It has a length of 15′, a diameter of 12′ 6″, and a mesh of 20″·50.

From Puri.

44 A net resembling the *khep* of Champāran and the *khepla* of Nuddea, but with the net turned inwards all round the margin and looped up to form pockets, so that the fish cannot escape between the weights; diameter 16′ 6″, mesh 2″.

It is called *khapiar* or *jabree jāl* in Muzaffarpur.

BAG-LIKE NETS.

15 *Boā Jāl.*—A net made of a coarse but thin hempen cloth with an open woof, and woven specially for the purpose. It is in the form of a long bag with a wide, deeply concave mouth 12′ in breadth when closed, the total length of the bag from the centre of the mouth being 15′. It rapidly tapers from the mouth backwards to a diameter of 1′ 13″. The cloth bag is tied at its mouth to a strong cord, with an intervening network 4″ broad to relieve the pressure of the stream against the bag; but at the corners the network is increased to 20″. Each of the two arms or corners of the mouth is fastened to a bamboo post, and tied to it about 2′ above the bed of the stream, whilst two other erect bamboos serve to keep the mouth open. The far end of the bag is kept open by a bamboo hoop, and the bag is prevented fouling by means of a bamboo driven into the bed of the stream on either side of the hoop. A long piece of cloth, generally a portion of the clothing of the fisherman, and known as *gamchha,* is tied under the hoop and extended backwards, as a kind of channel into which the small fish that find their way into the net are carried. The fishermen, of course, are standing in the water, one on either side of the far end of the *gamchha,* as it is only used in shallow water. By means of the free end of the *gamchha* the fish are transferred into a *handī* or basket.

Fry of all kinds are caught in this ingenious net.

It is known as *boā jāl* in Nadiyā.

16 *Beuti Jāl.*—A net on the same principle as the *boā jāl,* but made of hemp cord with a mesh of 1″·50 at the mouth and 0″·50 at the end of the long narrow bag or tubular portion. It is fixed in a running stream in the same way as the *boā,* but differs from it in the end of the tubular portion being firmly tied by a cord, so that the fish find themselves in a *cul de sac* after the net has been set for some time in a stream; and if the water be shallow, the fishermen wade in, and raising the net behind the mouth, shake the net backwards towards the closed end and the fish along with it, and as the end is approached it is raised, untied, and the fish shaken out into a basket or a *handī.* If in deep water this process is conducted from a boat.

All kinds of fish are caught in this net, which is known in the Nadiyā district as the *beuti jāl.*

47 This net is of the same shape as the *boā jāl,* but is made of strong net with a mesh that varies in diameter and strength, the net being especially strong in the long tubular end, which is extremely narrow at its free extremity. From the centre of the mouth to the end of the tubular portion is 25′ 3″, and each arm from the first-mentioned part measures 11′ and has a depth at the middle of 6′ 2″. The mouth when stretched is 17′ × 10′, behind its middle, and the net is 8′ 7″ broad. There is a split bamboo 1′ 6″ long tied across each arm near its free end, the latter being conical and attached along the bamboo, to the lower end of which a strong cord is tied for the attachment of a long rope by which the net is pulled in from the shore. The lower free margin of the arms and mouth is leaded. The mouth is kept open by a bamboo tied to its middle, but when the net is used in deep water the bamboo is not sufficient to float, but only to keep the mouth stretched.

The net is taken out into deep water and sunk, the long ropes being retained in the boat which makes for the shore from which the net is pulled in.

It is known as *bura jāl* in Nadiyā, and the name is said to be derived from the circumstance that the man engaged in working it becomes so fatigued that he resembles an old man, *bura.*

Crocodiles, turtles, and large fish are caught in the net.

48 This is a model of the net called *bihandi jāl* at Chittagong, and which is used for netting in rivers and canals, and which is sometimes 180′ in breadth. It is stretched across a stream from bank to bank, the arms being secured to the banks by ropes which run out from the bamboo post that supports the extremity of each triangular arm, the point where each arm joins the mouth being attached to an erect bamboo driven into the bed of the stream, and between the ends of which the upper and lower sides of the mouth are stretched. A long bag is prolonged backwards from the mouth, ending in a dilation which is kept distended by a hoop. The dilated portion has an opening at its middle, through which the fish are extracted, it being closed when in use.

This specimen measures 15′ in diameter across the arms and

mouth, 4′ in height at the mouth, the bag and dilated portion being 6′ in length. The mesh is 1′ around the mouth, but it is much finer in the lower end of the bag, whereas in the portion dilated by the hoop it is again large, and is made of fine cord.

The net being placed across the stream with the bag downwards, the fish are directed into it by the outstretched arms.

When the net is taken up to be examined, the upper side of the mouth is detached from the two erect posts, and, falling down on the lower side, closes the net, and then the two opposed sides are pulled up with their attached bamboos.

49 A long purse-like net, 25′ 9″ in length, with a breadth of 9′ 10″ at the mouth, which has a length from before backwards of 8′ 10″. The far end of the bag or purse is open, and has a diameter of only 11″. The mesh in the wide part of the net is 1″, but in the narrow part it is not more than 0″·25, and is made of very strong cord. It is on the same principle as the *boā jāl* of Nadiyā. Mr. Jones describes it as follows:—"*Muna jāl* (from *muna*, a purse). This is a spiral net, open at one end and tapering to a point at the other. The open end is attached to four stakes and the net is thrown out into the stream. The force of the current stretches it to its full length, and any fish entering at the mouth are drawn into the net and right up to the tapering end. When this is full of fish the net is taken in. The net is used in creeks or jheels, or placed at a break in an embankment, and its mouth expanded according to the width of the break. The force of the current carries in the fish."

It is called *muna* in Cuttack.

50 A net 8′ 10″ long and 2′ 8″ in breadth at the mouth and with a a mesh of 0″·50. It is open at both ends, but the narrow end, which is 1′ 9″ in breadth, is tied when in use. It is set in streams with the mouth distended, probably by a hoop or by pegs.

It is called *bandā jāl* in Puri.

FLOATING OR FIXED WEDGE-SHAPED NETS.

51 A wedge-shaped bag net with a convex mouth and tapering almost to a point at its closed end. It measures 32′ along the mouth and 14′ in depth. The mesh is about 0″·50. Nine feet of

each side of the net is tied on to a bamboo about 12′ long, and the mouth of the net is kept open by a bamboo placed vertically across it. The lower end of each corner bamboo is let into a *ghara* or *kulsi* about 14″ high, and which is filled with earth, the *ghara* being tied on to the bamboo. The *ghara* is sufficient to sink the net as far as nearly the upper margin of its mouth, and the bamboo of each side is fastened to a boat, the boats regulating the distance between the two sides of the net. This apparatus is specially constructed for the capture of the mango fish or *tupsee machi, Polynemus paradiseus,* which is easily caught in the meshes of the net owing to the very elongated rays of its pectoral fins.

It is caught in small numbers nearly all the year round, and is considered a great delicacy, but it is most abundant in June and July, when it enters the river in great numbers to spawn.

From the 24-Parganās.

52 A net triangular in form, measuring 70′ along the base of the triangle, which corresponds to the mouth of the net, and 35′ from the apex of the triangle to the middle of the base. The mesh is only half an inch in breadth generally, but there is a considerable area at the apex forming a kind of pocket, and here the mesh is only a quarter of an inch in breadth.

It is used in the following way:—The fishermen take the net with them on a large boat, and the necessary bamboos and ropes for fixing it. Five bamboos are used varying in length according to the depth of the stream. One bamboo occupies the middle of the base or mouth of the net, one at each corner of the net, and one between each of these. The side of the net that is to be downwards is tied to the lower ends of the three bamboos between the corners, and the other side about 10′ higher up; the corner bamboos have the net only tied to them at the lower ends. The bamboo of one corner is first fixed in the bottom of the stream, and then the others are let down individually one by one and fixed, the bamboo of the corner being secured as in the case of the first, the mouth of the net being up the stream. If the water is so deep that the bamboos do not reach the bottom, each has an earthen *jalla* tied to the lower end, acting there as a weight. Each *jalla* weighs from 20 to 30 lb.

After the net has been in the water for one or two hours, the

corner banboo that was last fixed is pulled up, and of course the net along with it, but the net is not untied from the boat, but both are stored on the boat. The net is then pulled in as far as the next bamboo, which is drawn up, and the upper attachment of the net unloosened, the bamboo being allowed to fall outwards on the mouth of the net, but the lower attachment is left untouched. The bamboo is then drawn into the boat along with the net, and the same course is followed with the two next bamboos until the other corner bamboo is reached, but it is not removed from the stream, the rope by which the net is tied to it being long enough to admit of what remains of the net being pulled into the boat and the fish removed.

The following fish are caught in this net:—*Labeo rohita, Rohtee cotio, Chela gora, Ailia coila.*

From Murshidabad. The Bengali name is *bans jāl.*

SCREEN-LIKE NET.

53 Consists of two parts, one of which is set across the current from bank to bank, and that part of the present net is 80′ long and 14′ deep; the extremity on either bank is secured to an erect bamboo, and the intervening portion is secured by three bamboos driven into the bed of the stream, and to the upper end of these the net is tied; its lower side is weighted with bricks, to keep it in contact with the bed of the stream. A complete screen is thus thrown across the channel. This part of the net has a mesh of $1\frac{3}{4}$″. The second part of the net is directed down the stream at right angles to the position just described, and it is attached to the first bamboo, which is usually fixed about 21′ from the bank, and is always propped up by another bamboo, and to these two the second portion of the net is attached. It forms a channel 64′ in length, 4′ wide, and 3′ 10″ deep. The free margin of this channel has a cord running through it, and the opposite side of the channel is attached to the main net, half way between the two first bamboos in the stream, and this side of the channel is imperfect for about 16′. The sides of the channel are kept apart by a kind of cross-bow, which is erected at the middle of its length, the far end of the channel being attached to an erect bamboo. Inside the channel there are two secondary short channels, one after the other, the first channel terminating invariably at the cross-bow, into the upper

extremity of the stem of which the two cords of the free margin of the first channel are fixed, so that this extremity of the channel is almost closed, the margins being opposed to one another; beyond this, at a distance of 13′, the second short channel, about a quarter of the length of the previous one, commences, and beyond it is the termination of the main channel. From the position which this net occupies in the stream, it is only adapted for the capture of fish passing upwards. The fish, finding their course obstructed by the cross net, swim all around it and also along the sides of the longitudinal portion, until they find their way into the channel through the imperfect side. Then, finding themselves between the two sides of the channel, pass along through the secondary channel to its end, from which they find no exit, the lateral margins of this channel being kept on a level with the surface of the water by means of the terminal bamboo and cross-bow, otherwise the fish would escape.

This net is known as *kona jāl* in Nadiyā.

PURSE-LIKE NETS.

54 A net resembling a purse pocket, and closed suddenly by means of a bamboo attached to the opposite side from that on which the fisherman stands when working it, and crossing the middle of the mouth. The mouth is 29′ long, and when fully open 12′ broad, the depth of the net 8′ 1½″. Two long bamboo sticks, overlapping at the middle, are run through the meshes along each side of the mouth, and the closing handle, at cross bamboo, is tied, as already said, to the side opposite to that on which the manipulator stands. A thin cord is also tied to the opposite side of the net, and is held by the fisherman using the handle. The bamboo is pulled, and the fishing boat is neared towards the net, and the cord also seems to bring the sides of the mouth together. The net is then pulled into the boat and the fish shaken out.

It is called *khārki jāl* in Murshidabad. The fish caught in this is chiefly *hilsa*.

55 A net on the same purse principle as the *khārki jāl*, also worked from a boat and weighted with a brick on one side. A long line passes across the middle of the mouth of the net, which is only

allowed to open to 5′ 3″ by means of an enlargement of the rope on the near side. By pulling the rope the mouth is closed. A cord 43′ 8″ long is attached to the weighted side of the net, and by means of it the fisher is made aware whether any fish have been netted. The mouth of the net is 26′ long, and the net itself is 10′ deep, with a mesh of 2″·50. It is made of hemp and is used in catching large fish such as *Catla*, *rnee*, and *hilsa*.

The net is called *sangree* in Nadiyā.

56 A purse net exactly like the *khārki jāl* of Murshidabad and *sangree* of Nadiyā. The mouth of the net is 19′ 5″; it opens to 5′ 6″ at the middle the net having a depth of 5′ 6″ and a mesh of 4″. It is made of hemp.

It is called *sooghel* at Patna.

57 A purse-shaped net like the *khārki*, 25′ long, 9′ deep, and with a gape of 6′; mesh 1″; used from a boat in netting *fesha* or *fhaisa* fish, a species of *Engraulis*.

From 24-Parganās. Called *fesha jāl*.

58 A purse-shaped net like *khārki*, 24′ long, 5′ 8″ deep, and with a gape of 6′ 8″, mesh 2″. Used for catching *hilsa*, *Clupea ilisha*.

Coloured by the fishermen in order to make it look gay, as they were aware it was bought from them for the Exhibition.

Called *shangra* in the 24-Parganās.

NETS ON TRIANGULAR FRAMES.

59 A triangular conical net fixed by its margin between two divergent bamboos which are kept apart and in position by a short cross bamboo below their point of junction. The mouth of the net when fixed forms a triangular aperture of 4′ every way. The margin of the net for about 6″ is made of cord and with a wide mesh, while its remainder is made of fine cotton twine with a mesh of ¼″. The base of the triangle is applied to the muddy bottom, and pushed forward by the fisherman holding the cross piece of bamboo by his left and the end of one of the lateral bamboos in the other hand. Only small fish and shrimps are caught in the net, which is one of the most prevalent forms all over the East.

The present net is from Motīhāri, where it is called *bisri*.

60 A triangular net of the same form nearly as the *bisri* of Motīhāri, measuring 21′ at the base and 13′ at the sides, with a mesh of 0″·25. The two lateral bamboos between which the net is stretched are 16′ 9″, crossing each other two feet from the upper ends, and one foot below the apex of the triangle there is a cross bamboo keeping them apart. In the fork formed by the ends of the bamboos stands the fisherman grasping the cross bamboo and pushing the base of the net before him, over the bed of the stream, scraping up any fish and prawns as he progresses. The net is raised at intervals and emptied into a basket carried round the waist.

The net is called *besali jāl* in Nadiyā, and in it are caught prawns and small fish. It is called *besali* because it scrapes the ground.

61 Resembling the *bisri* of Motīhāri, and used in the same way and for the same purpose, but more roughly made, and one lateral bamboo curved. Base 3′ 6″, sides 4″.

The net is called *sitki* in Nadiyā.

62 A triangular net like the *bisri* of Nadiyā, and measuring at the base 10′, the sides between 6′ and 7′, and mesh 0″·25. It has a small pocket at the apex, which is open when not in use.

It is called *chitki jāl* in the 24-Parganās.

It has been coloured with some dye by the fishermen, as they were aware it was intended for the Exhibition.

63 A model of a net resembling the *bisri*, but with a short pocket and a wide mesh. It is used for catching *hilsa* fish, and it measures 12′ long, with a mouth of 18′.

It is called *ilsha jāl* in Chittagong.

64 A model of a net resembling the *bisri* and *besali*, but only one lateral bamboo is prolonged beyond the apex, and there is a long pocket.

It is called *tānu* or *doka jāl* in Chittagong.

65 This net resembles the *bisri* of Champāran in being stretched between two divergent bamboos tied together, but in its structure the net in having a basal pocket is like the *luhi jāl* of Chittagong,

and is worked from a boat. A flat piece of wood is tied on to the lower end of each bamboo to act as a kind of shoe to prevent the bamboos sinking in the mud. Like the *luhi jāl* also one lateral bamboo projects far beyond the other as a handle. This is a model measuring 24″ at the base and 34″ at the sides.

It is called *tangu jāl* in Chittagong.

66 A model of the net known as *luhi jāl* in Chittagong. It is constructed in much the same way as the *besali jāl*, the triangular mouth being distended between two bamboos; but, unlike that net, it is worked from a boat, and its sides, when relieved of the pressure of the current, fall together and serve to close the net. It has a long posterior pocket, as in some of those shore-nets, but it differs from any of them in the lower or basal portion of the mouth being double, so that there is a pocket at this portion. A long rope is tied to the basal end of each of the side bamboos and is fastened to a peg driven into the bank on each side of the river. The boat then carries the net into the middle of the stream, and when the total length of the side ropes is out, the mouth is fully distended and the long bag is also kept open by the current. One of the side bamboos is much longer than the other, and forms a kind of handle, by which the net is worked from the boat; and when pressure is taken off the net by pulling up stream, the long handle being raised, the bamboo, which is loosely tied to it, falls in against it, and the net is closed and lifted on board, the fish being extracted at the long pocket and bag behind. In raising the net it is not necessary to disconnect its sides with the shore pegs.

The model measures only 3′ along the side and at the base, but some nets have a base of 45′ and a length of 36′.

From Chittagong.

67 A net of the same kind as the *besali* in form, but made of string, with a very large mesh about 2″ in diameter. The base of the triangle is 16′ 10″ and the right side is 9′ 7″, and the left side 11′. The net is prolonged much backwards towards the left side, so that one man can work the net without interfering with the action of the pocket.

Only large fish are caught in it, and its name at Patna is *poute jāl* or *pounti jāl*.

68 A simple cotton net stretched between a triangular bamboo framework and with a long pocket behind. The base of the triangle measures 13′ 4″ and the sides 10′ 9″. The pocket can be opened or closed by a cord, and through the opening the fish are removed. Only small fish and prawns are caught with it, the net being used in the same way as the *bisri* and *besali jāls*, and is worked by one man, as in the case of the former net.

It is known as the *chipona jāl* at Patna.

69 A conical net stretched on a triangular bamboo framework, the base measuring 19′ 2″ and the sides a little over 11′. The apex of the net is a long narrow pocket, and the last 12″ are much stronger than the net, which is made of cotton. There is a wide meshed margin all round the net, and at the base there is another wide meshed area less open than the former, but with a much wider mesh than the net itself, which has a mesh of only 0″·75. Two men are required to work the net on account of the long pocket that trails behind the apex of the bamboo triangular framework; so a man walks on each side pushing the net forwards, in the same way as the *bisri jāl* of Champāran.

It is used for catching small fish only, and is called *bisaree* in Patna.

70 A net resembling the *bisri jāl* of Champāran, measuring 4′ 8″ along the sides and from the apex to the base 6′ 8″. The base forms a scraper, to which the net is permanently attached, and which has sockets for the receipt of the side bamboos.

The mesh is fine, and the net is made of cotton.

It is accompanied with its basket, which is tied round the waist of the fisherman.

It is called *palona jāl* in Cuttack.

71 A model of another net resembling the *tānu* or *doka jāl* of Chittagong, but without a pocket, a cross piece keeping the sides asunder, and with a wooden scraper at the base.

It is called *pelan jāl* in Chittagong.

72 *Thella Jāl.*—This resembles the *bisri jāl* of the Champāran district, but the net is not so loose, and the lower border is defined

by a cross bamboo, so that the frame forms a triangle. The upper cross piece which keeps the side bamboos apart in the Champāran net, is absent in this one. The side pieces project beyond the apex of the triangle and act as handles. It is used for catching prawns. It measures at the base 3′ 9″ and at the sides 4′ 3″. Its mesh is 0″·25.

At Jessor it is known as the *thella jāl.*

73 A net made of cotton and with a mesh of 0″·50 and 1″ at the sides. It is triangular in form, the base measuring 21′ 7″ and the sides 24″, the apex being elongated at one side into a kind of bag, so that the total length of the net is 28′. The sides are fastened to two divergent bamboos, and the bamboo on the right side is prolonged about 3′ beyond the apex, and a little below the apex the two divergent bamboos are kept apart by a short oblique bamboo tied between them. This large triangle is used from the prow of the dug-out which accompanies the Patna exhibits, and attached to which there is a piece of board on which the left bamboo rests a little below the apex, the latter abutting on the right bulwark of the canoe. Through the centre of this piece of wood, a strong bamboo passes backwards for about 4′, and is tied to another bamboo wedged crosswise over the bottom of the boat. The framework, when raised, has the projecting portion of the right bamboo brought down under and secured to the bamboo that passes backwards from the piece of wood on which the frame rests, and in lowering the net it is freed from this bamboo and the frame swings first to the right and then to the left until it adjusts itself. When the net is raised the fish fall backwards into the loose or baggy portion at the apex, which is then drawn into the boat and emptied.

Large fish are caught in this net.

In the Muzaffarpur district it is called *lahotree jāl.*

NETS WORKED ON BAMBOO FRAMES.

74 This is a conical net, which is used by means of a framework of six bamboos tied together at the apex, and kept in position by a bamboo hoop about 4′ 9″ below the apex, the hoop having a diameter of 3′ 6″, the lower ends of the bamboo enclosing a space 7′ 8″ in

diameter. The framework has a height of 10′ 2″, which is the length of net, which is tied by its lower margin to the ends of the bamboos, the apex of the net being loosely tied to the apex of the cone of bamboos. The net has a mesh of 2″, and is made of hemp. Around a breadth of 5″ of the margin there are a series of net pockets, which hang loosely and prevent the escape of the fish. The net is used from boats, and a long spear is required, and also a long-handled spade-like instrument, which is used as a kind of feeler.

The apparatus lies sideways in the boat, and when it is to be used, one fisherman stands on the side of the framework, and laying hold of it, he turns it over towards him on his thigh, raising it at the same time, and thrusting the mouth downwards into the water. After it has sunk in the water and reached the bottom, he climbs on to it—if the water is deep, on to the top of the bamboo frame, and if shallow, on to the hoop. He then loosens the cord by which the net is tied up to the apex of the framework, and the net falls to the bottom. He then uses the feeler, which may be the rudder of his boat, to ascertain if any fish are under the net; and if he finds one, the spear is used, the feeler being the guide to the position of the fish, which is speared and recovered. Large fish are caught in the net, such as *Labeo gonius, Catla buchanani, Labeo rohita, etc.*

The net is from Motīhāri, and is called *kurail.*

75 A small net, apparently on the same principle as the *kurail* of Motīhāri. Net 4′ 9″ long, with a diameter of 4′ 6″; mesh 1″.

It is known as *poluha jāl* in Puri.

76 A conical net with a mesh of 0″·50, and measuring from the apex to the border 2′ 5″. The mouth has a diameter of about 3′, and is tied on to a bamboo circle of its own diameter, four bamboos rising upwards from the hoop. When to be used, the apex of the net, to which a cord is attached, is loosely tied to the apex of the bamboos. When a fish is seen, the fisherman encloses it in the hoop and lets the apex of the net fall, and then he tramples on the net to feel where the fish are, and having found one he grasps it with the net, and turning it over the side of the hoop, lets the fish fall into a basket.

It is called *chabi jāl*, and is a miniature of the large net called *kurial* in Champāran.

The following fish are caught with it:—*Mastacembelus armatus, Anabas scandens, Ophiocephalus marulius, Ophiocephalus punctatus, etc.*

From Nadiyā.

77 A net of the same character as the *chabi jāl*, having a diameter at the mouth of 4′ and a height of 21″, with a mesh of 1″·25.

It is called the *pāhi jāl* in the Muzaffarpur district.

78 A net resembling the *chabi jāl* of Nadiyā, and known as *poluha jāl* in Cuttack.

79 A net 6′ 8″ square, with a short pocket in its centre. It is made of cotton cord, and has a mesh of 0″·50, except at the margins, where there are two lines of mesh nearly 1″·50 square. Each corner is tied to the tapering end of a bamboo wand 6′ 10″ in length. There is a bamboo handle 8′ 4″ long, and at its far end four branches are tied crosswise, and each of them receives the thick end of the bamboo wands, so that two arches are produced, the far off end of the handle being attached to the arches. The net is thus distended as a square, and when it is to be used the pocket is tied loosely up to the arch, and the man wading holds the stretched net out before him and places it down flat in shallow water, and this done the cord of the pocket portion is freed and the net falls to the bottom. The fisherman then feels over the net if any fish have been covered, and removes them.

It is on the same principle as the *kurial chabi*, etc., and is known as the *dharam jāl* in Chittagong.

80 A hoop 1′ 4″ in diameter, supporting a bag-like net 3′ in length, and tapering gradually to its lower end which can be opened and closed. There is a *septum* about 11″ from the mouth with a narrow opening leading into the lower part of the bag, so that fish passing beyond it cannot find their way out. The mesh is 1″.

It is called *chack jāl* in Chittagong. No information regarding its use accompanied the net, which is probably used as a trap set in running-water.

80 (*a*) *Chatki Jāl.*—A four-cornered net measuring 4′ × 3′ 7″ with a mesh of 1″·50, and used for catching *Mugil corsula*. It is stretched at the four corners by two bamboos, each of which describes an arch 32″·50 high over the net to the corner opposite to its first attachment, and the two bamboos are tied together where they meet, and here each is strengthened by a small slip of bamboo being lashed over it.

The net is placed close to the bank of a tank, being only submerged from 4 to 6 in. A cord is secured to the centre of the double arch, and the fisherman, holding the other end, hides behind a bush, and when he observes the fish over the net, he suddenly gives it a strong pull or jerk, and the net and fish are whisked out of the water.

This net is called *chatna jāl* in the Nadiyā district, and around Calcutta it is known as the four-cornered net.

81 A net 2′ 1″·50 in diameter, tied around a bamboo hoop. It is used for catching small fish in tanks. It is swept downwards and upwards through the water in which the fisherman is wading.

It is called in the 24-Parganās *chakni* in allusion to its roundness.

82 A landing net with 3″ mesh, and measuring in length 4′ 1″ and a depth of 22″.

From Murshidabad.

SPECIAL NETS.

83 For the working of this net a complicated arrangement of long bamboos and a boat are required.

First a tripod, called *peet gonz, i.e.*, back post, is fastened into the bank, or it may be a short way into the water. About 15′ further outwards from the tripod an erect bamboo called *māj gonz, i.e.*, middle post, is fixed to the bottom of the stream, and 5 ft. further out another, called *mool gonz, i.e.*, principal post, is similarly secured, and the boat, *nouka*, lies between them. These erect bamboos are kept in position by two other bamboos placed about 10′ up the stream, and called *paggla gonz, i.e.*, the supporting posts, and these are slightly bent downwards and tied to the upper ends of

the *māj* and *mool gonz* respectively, about 11′ above the surface of the water. From one of the posts of the tripod, at a distance of 3′ from one another, the end of the lower bamboo resting on the ground, two bamboos are directed outwards and upwards, one above the other, the lower, the *pāot*, or step, rising to 24′, and the upper, the *hat bans*, or handrail, to 26′, both being tied to the *māj* and *mool gonz*. The *māj* and *mool gonz* are connected by two cross bamboos 5′ long, the lower placed tranversely and the other obliquely upwards, but they have no particular names.

This framework is quite independent of the net, and is only the means by which the net is worked.

The apparatus in connection with the net itself consists first of a long strong bamboo tied loosely by its lower end which rests on the ground to the *mool gonz*, and is known as the *oopāot*, and which forms a very acute angle with the *mool gonz*, and is close to the side of the boat. Two long slender bamboos, about 13′ each, are tied to the upper end of the *oopāot*, one above the other, one pointing up stream and called *paggla bans*, *i.e.*, foolish bamboo, and the other down the stream, and known as *bashkor bans*, *i.e.*, that which floats in the air, the inner ends of these bamboos overlapping each other at the *oopāot* and tied together, but somewhat apart. The outer end of the *bashkor bans* is loosely secured by a long cord to the upper end of one of the *paggla gonz*, while the *paggla bans* is held in position by a cord attached to its middle and fixed to a bamboo placed up-stream and also called *paggla bans*. One corner of the net is tied to the outer end of the *paggla* and another corner to the *bashkor* bamboos, and to the inner end of the *paggla bans* a bamboo 30′ in length is tied projecting outwards over the stream, and is called *mool dahri bans*, chief bamboo, and to it another corner of the net is tied. Its inner end projects backwards for about 4′ or 5′ beyond the *oopāot*, and a small bamboo tied on to its extremity passes downwards and is fixed to the *oopāot*. This small bamboo is called *goodomeh bans*. The portion of the net between the *paggla* corner and the *oopāot* is tied to the latter near its middle, the fourth corner itself being secured to the middle of the boat.

The net is lifted and let down by a rope attached to the upper end of the *oopāot*, and is worked by a man, who walks up and down the *pāot* bamboo, holding on by the *hat bans*. In letting down the net he holds the rope in his hand, but in dragging it up he puts a

loop around his waist walking down backwards along the bamboo. When the net is raised the rope is fastened to one of the bamboo posts of the tripod.

After the net has been let down, the fish in the process of raising it fall down towards the boat, and the loose portion of the net at the boat's side is pulled in and the fish shaken out of it into a basket or *handi*.

This net is called *khara jāl* in the Jessor district.

All kinds of fish are caught in it.

84 Between the months of September and November branches of trees are piled in the centre of a *jheel*, or very deep still water, where the net is to be used, and by the beginning of March the spot has become the resort of numerous fish. The net is then set, and its size depends on the extent of the mass of branches in the *jheel*. The present example of the net consists only of two pieces with a mesh of 0″·75, each measuring about 25′ 8″ by 17′, the greater measurement being the depth of the net; but when large areas are covered with bamboos, as many as ten or twelve such nets are used. In setting a net, say, of two pieces only, three bamboo posts are used, and two of them are driven into the bed of the *jheel*; but before the third is fixed, the border of one net is laced round it, leaving about 9′ of the net above water; and the remainder, submerged, is held down by the earthen sinkers. To the next bamboo the far off third of the net is similarly laced, the men diving to fix the portion under water, and the same course is followed with the other net, beginning with the first bamboo. All the portions of the net above water are closely laced together, and the height of 9′ above water is maintained to prevent the fish from jumping out. The opposed free ends of the nets are at first not tied below water, as the boat from which the previous operations have been carried on has now to enter the enclosure, which it does by pulling up the free ends of the net and passing under them. Having closed the inside, the men throw the branches outside, diving to bring up all, so as to have the bottom clean. This having been done, the boat is taken out again, and two men entering the inside dive to the bottom and draw over carefully to the opposite side of the enclosure the sinkers of one net; and after this has been done, the same course is followed with the other net, so that the bottom is covered with two layers of the net. One man

then dives outside the net and ties together the overlapping nets with a long line, which he passes to the boat. Two men then dive down to the base of the first bamboo and the other point where the other margins of the nets meet, and as traction is exercised from the boat on the bottom of the net, they drag up the side of the enclosure with them. The sides of the net being loose, the fish betake themselves to them when the men are working under water. The net is then pulled into the boat and emptied. The fish generally caught in this net are *Labeo calbasu, Cirrhina mrigala, Labeo rohita, Notopterus chitala,* and large prawns.

It is known as *komār jāl* in the Nadiyā district. This name is apparently derived from the circumstance that a potter, *komār,* is required to manufacture the sinkers, which are made of earthenware and are elongate and perforated lengthwise, and are strung on to the lower border of the net.

85 This is an hexagonal frame enclosure defended above by nets, and with a deep bag-shaped net suspended to it internally. The sides of the hexagon are 9′ broad, and the posts forming the corners are 20′ long, of which about 3′ are fixed in the bed of the stream, with 7′ above water. About 1′ 6″ above the level of the water they are connected by cross bamboos, over each of which a net is threaded about 7′ deep, each being suspended as a screen from the erect bamboos about 4′ above the cross bars, and permitted to hang down below as a kind of ample pocket along the outer side of the cross bars. There are only five of these nets, as one side of the hexagon is left open. The interior of the enclosure is fitted with a long bag-shaped net, tied also to the cross bars, except at the open side, where it is pulled in and secured to the corner opposite to it, and as there is a slit down this side of the bag for a short way, the fish find their way in through it, and are directed towards the opening by a screen-like net that runs outwards to the bank, where it is secured to a bamboo post being attached internally to the upper slit portion of the bag net, the long end of which hangs down almost in the centre of the enclosure. The fish pass in from up and down stream, and, not being able to find their way out, try to clear the lateral screen, and, in doing so, fall into the saccular or pocketed portion outside the cross bars. As the net is in deep water it is worked by a boat. The mesh of the bag net is 1″·50, and of the

screen nets 2″. The fish caught in the net are *Catla buchanani* and *Labeo rohita*.

It is called *tatree jāl* in Nadiyā.

Chand Jāl.—This apparatus consists of two parts. First a piece of jute cloth, 28′ long by 13′ 2″ broad, doubled upon itself and closed at one end; the second part consists of a string 73′ long, to which portions of the carapaces and plastrons of *Trionyx gangeticus* are tied at intervals of 6″. This net is only used in shallow water and at night, and, as it is frequently used in moonlight nights, it is called *chand jāl*.

When in use the cloth portion is opened, the closed end being towards the bank and held by one man, while each corner of the open end is held by a fisherman, who also has one end of the rope with broken turtle-shells tied to it. They all wade into the stream, and the middle of the turtle-rope is first let down, and then they walk backwards in the direction of the bank, paying it out as they go, so that, when fully paid out, it forms a triangle, of which the cloth, when extended, forms the base. Each of the two men then pulls in his own end of the turtle rope, the bones of which turning over shine in the water and frighten the fish towards the cloth, which, when it has had the rope completely drawn in in front of it, the fish pass into it, and the two corners are rapidly raised and shaken towards the man who holds the opposite closed end.

Ground swimming fish are caught in it.

From Nadiyā.

86 A small net made of the fibre of the stem of the leaf of the *tār* palm, *Borassus flabelliformis*. The net has the form of an elongated cone measuring 1′ 9″ in length with a diameter of 10″ at the mouth. The mesh measures 3″·50 × 2″·50. A cord 9″ long, and also of palm fibre, is attached to either side of the aperture, and by means of it the net is fixed by two wooden pins to the bed of the shallow stream.

Only two kinds of fish are caught in it, viz., *Ophiocephalus marulius* and *Ophiocephalus striatus*.

It is called *fanshi jāl* in the Nadiyā district.

87 A net resembling the *fanshi* of Nadiyā, 31″ in length, and with a large mesh.

It is called *fansa* in Puri.
From Puri.

DEEP-SEA NETS.

88 A Y-shaped bag net measuring 21′ 7″ from the apex to the middle of the mouth and 51′ 10″ along the arms from the apex, the breadth between the extremities of the arms being 49′. The mesh around the apex measures only 0″·50 and 2″·50 in the arms. This form of net is used from a *catamaran*.
From Puri.

89 A large deep-sea net of a Y shape, 537′ of each arm having a mesh of 2′ 6″ and a breadth of 190′, the upper side having floats made of the branches of a tree yielding light wood, and the lower side sinkers of stone and brick. The remainder of the arm to the beginning of the mouth has a mesh of 2″·50, and this portion is about 100′ long. The breadth of the expanded mouth could not be ascertained, as there was no space sufficiently large in the museum grounds for its display, neither could the depth of the capacious mouth be given. The mouth terminated in a bag 40′ long with a breadth of 12′ and made of a fine cord, the mesh not exceeding 0″·50. This net, which is not sent owing to its great size, resembled the smaller net also from Puri, but the bag was more pronounced.
From Puri.

MATS FOR CATCHING FISH.

90 A reed mat used for catching *Mugil corsula*, a surface swimmer, found in shoals, although it dives rapidly when disturbed. The mat measures 28′ 3″ × 8′ 3″. Along one side, a small net 4″ in height, is attached from one end of the mat to the other. It can be placed in an erect position by small pieces of bamboo, which are tied on by cords ready for use. A long rope or cord covered with *shola* floats at intervals is tied on to a corner of the mat next the bank or boat, and there are two such. A long cord is attached to each of these float ropes, and when the mullet appear between them, the floats are drawn together, so that the fish are frightened, and leap on to the mat, which is kept stretched by bamboos tied along its length. The marginal net prevents the fish wriggling off, and the mat may either be drawn to the bank or on to the boat, and the

fish are removed by a landing net, having been first knocked on the head by a small bamboo.

It is called *gainti jāl* in the Murshidabad district.

91 This raft is similar in construction to the *gainti jāl* of Murshidabad and used for the same purpose, but without the little side net, and made of the stems of *kara*, probably a jute. It measures 23′ 9″ long and 6′ 9″ broad, the ends being rolled up for 1′ 8″ to prevent the fish swimming off the mat, and along both sides a bundle of reeds is bound for the same object; at each end of the mat or raft a rope is attached with *shola* floats as in the *gainti*.

It is called *burra sirkee* at Muzaffarpur, the latter term being applied to the stems of the different species of jute.

92 A long narrow mat or raft made of the stems of the jute plant, *Corchorus capsularis, Lin.*, or *C. olitorius, L.* measuring 21′ 3″ long and 1′ 5″ broad, the stems bound together by three lines of cord, and with thirteen split bamboos measuring 2′ 1″ in length and 1″ in breadth introduced at regular intervals with one at each end, and one end of each bamboo projecting on one side 8″ outwards beyond the mat. To each of these projecting portions of the bamboos a cord is tied for securing the raft to a bamboo as long as itself, the bamboo being attached along one side of a dug-out specially constructed for this kind of fishing, one side of the canoe being cut away almost to the water's edge. Along this portion lies the bamboo to which the raft is attached, one side of the latter only being covered by about 4″ of water. This arrangement is only used at night and in still water not more than about 3′ deep, where the *Mugil corsula* abound. The white bleached stems of the jute attract the fish and they jump on to the mat, and as soon as they are on it the two men who propel the canoe on either end rapidly turn up the raft.

It is called *chota sirkee* in Muzaffarpur.

TRAPS MADE OF FINELY SPLIT BAMBOOS.

Conical Hand Traps.

93 A conical trap, 24″·50 high, its lower aperture having a diameter of 24″·50, and its upper opening, of 50″·50. It is made of split

bamboos, which are tied together round the hoop which constitutes the upper opening, about 5 in. below this point; each piece of bamboo is split into four, and these being pulled asunder are kept apart at regular intervals by bamboo hoops to which they are tied with twine made of the fibre of the jute plant, *Corchorus capsularis, Lin.*, or *C. olitorius, Lin.* The ends of the bamboos in this trap are left free below, which serve to give the trap a hold on the mud to which it is applied when fish are to be caught. The following is its use:—The fisherman wades into shallow water, generally of some partially dried-up *jheel* or tank, and pressing down the wide mouth of the trap against the muddy bottom with his left hand, introduces his right arm through the small upper openings, and feels all around the bottom for any fish that he may have covered.

It is only used in shallow water, and not unfrequently as many as forty or fifty persons, men, women, and children, work over a drying *jheel*.

This kind of trap, instead of being conical, may assume a variety of forms depending on the relative diameter of the hoops used to fix the split bamboos that radiate downwards from the upper opening. Some are perfectly bell-shaped, while others are similar to much depressed bells of considerable width.

This specimen is from Motīhāri, in the Champāran district, and is the simplest form of this kind of trap, and there it is known as *tapi*.

94 A conical trap 2′ 1″ in diameter at the base, and 5″·50 at the upper aperture, and having a height of 1′ 10″. The workmanship of this is superior to any of the other traps of this kind, and the shape is rather elegant.

It is called *polo* in the 24-Parganās.

95 A conical trap resembling the *tapi* of Champāran and the *polvi* of Barhampur. Height 21″·50. Diameter at lower aperture 24″ and at upper opening 3″·50.

In Muzaffarpur it is called *tap*.

96 A trap resembling the *polo* and with a diameter of 2′ 3″ at the mouth, and a height of 1′ 6″.

It is called *palo* in Chittagong.

97 The next example is an illustration of the bell-shaped trap of of this kind. It is 23″ high, and with a diameter of 26″ at the lower and 5″·50 at the upper opening.

It is from Murshidabad where it is called *poloi.*

98 This specimen is of the depressed bell-shaped form, and is also from Murshidabad where it goes by the same name as the last. It is 28″ high, and has a diameter at the low opening of 28″·50 and at the upper aperture of 5″.

It is used for capturing mud-frequenting fish.

Scoop-like Traps.

99. A small trap made of split bamboos, resembling a truncated cornucopia, with only one aperture, the other end tapering to a point and held by the hand. The margin of the aperture is pressed against the mud and carried along it to the bank, where the trap is gently raised and any fish in it removed ; length 20″·50, diameter of mouth 12″·50.

This trap is used in Motīhāri, where it is known as *gānj.*

100 A fishing scoop resembling the *gānj* of Champāran and the *honcha* of Nadiyā, but differing from the latter in having the handle much curved, even more so than in the former.

In Muzaffarpur it is also known as *gānj.*

101 Of the same type and of the same use as the *gānj* of Motīhāri, but more scuttle-shaped, the handle forming an acute angle with the scoop.

It is called *duri* in Jessor.

102 A fishing trap resembling the *gānj* of Motīhāri.

It is called *khainchi* in Puri.

103 *Honcha.*—Of the same construction as the *gānj* and *duri,* but the handle is straight.

It is known as the *honcha* in the Nadiyā district.

104 A trap resembling the *gānj, duri* and *honcha,* but used like a

scoop, being swung forward by means of a cord between the handle and mouth of the trap.

Fish caught in it are removed by hand.

It is called *hoinchee* in Cuttack.

105 A triangular scoop, made of fine bamboo mat-work with an open mesh, the middle line of the triangle strengthened by a cane passing from the apex to the base. The latter is scooped along the muddy bottom and rapidly raised, small fish and prawns being thus caught.

It is called *luhi* in Chittagong.

Platform Traps.

106 *Bhanta.*—A flat framework made of split bamboo, the pieces being tied together longitudinally, with interspaces of ¼″, with the fibre of the peduncle of the leaf of *Borassus flabelliformis.* The sides are turned upwards for 1″·50, and at one end there is a vertical screen 8″ high of the same character and breadth as the flat portion, which measures 1′ 7″ × 1′ 2″.

It is used in small watercourses that are rapidly falling, as after a shower of rain. It is placed at an angle, with the screen downwards, and as the water falls the fry are left stranded on the frame.

It is called *bhanta* in the 24-Parganās.

Triangular Shore-hand Traps.

107 A triangle of bamboos, measuring at the base 1′ 11″ and at the sides 2′ 1″. The triangle carries a network made of split bamboos, 1′ 8″ long and 10″·50 deep at the apex.

Small fish and chingries are caught in it.

It is used like the *sitkhi* and *bisri jāls,* and is called *honcha* in the 24-Parganās.

Cylindrical or Partially Compressed Traps.

108 A cylindrical trap 2′ 2″ long and 1′ in diameter at the mouth. The mouth is almost wholly closed by a screen of nearly vertical bamboo slips on each side, meeting internally 8″ within the mouth, but with a space of about half an inch between them. On one side of the trap, near the base, there is a triangular aperture closed by a correspondingly shaped door, through which the fish are taken out.

It is set with its mouth up the stream.

It is called *arsi* in Sāran, but other traps of a different form from this go by the same name in that district.

109 A tube 1′ 11″·50 in length, and slightly broader at the middle than at the ends, which have a diameter of 7″·50. One end is closed and the other open, and inside the latter there is a funnel-shaped entrance of split bamboos about 7″ long that converge towards the wake of the tube leaving an opening of about 2″. Fish passing beyond the opening cannot find their way out.

It is called *dhole*, or *hoambu chai* in Chittagong.

110 An elongated conical trap with an oval mouth, made of finely split bamboo slips and measuring 4′ 11″ in length with a diameter of 17″·50 across the mouth. Within the latter there is a funnel-shaped channel of cross slips of bamboo. This trap is used in shallow water, in *jheels* and sometimes in a paddy field inundated with rain water. It is tied to the ground, and any fish entering through the broad opening remain within the enclosure, as there is no means of egress. When the trap is taken out the fish are removed through the pointed end, which is opened.

The trap is called *mugura* in Cuttack, and is chiefly used during the rainy months.

111 A laterally compressed trap made of split bamboo and open at one end which is placed up-stream. Inside the opening, there is a cross arrangement of fine slips of bamboo in two series, one within the other, tied to the side of the trap, so that the fish once passing them cannot return. The fish are removed at the side of the trap which is only tied together by a string.

Length 25″ × 14″·50 × 4″·50.

Fish are caught in this trap as in the preceding one.

From Motīhāri, where this trap is called *tohka*.

112 This is another example of this kind of trap, but more complicated than any of the foregoing. It is oval in front and triangular behind, the oval measuring 3′ × 2′ 1″, and the base of the triangle, which rests on the ground, 1′ 2″, and the sides of the trap 3′. Its length is 2′ 8″.

A vertical partition or screen made of fine bamboo splints, with their inner extremities pointed, divides the oval space into two. The bamboo splints increase in length from above downwards, so that the lowermost ones reach back nearly to the triangular end of the trap. Another screen partition, but with the splints of equal length, is prolonged inwards from either side of the oval mouth, and the pointed ends of the splints of the two sides interlock, except below, where they are divergent, the middle screen hanging loosely between them. Within these there are two other lateral partitions also fixed to the sides of the trap, but they are firmly tied to each other in the middle line, but a small aperture is left between them below, and through it the long splints of the mesial screen project backwards at an acute angle to them. The fish pass through these low openings into the back part of the trap, but cannot return by reason of the long splints that lie in the back opening.

It is called *doari* in the Nadiyā district.

A variety of small fish are caught in it.

113 A slightly compressed tubular trap, wider at the mouth than at the other end, and measuring 21″ long.

It is of the same type as the *tohka* of Motīhāri, and is called *birtee* at Patna.

114 A trap of the same construction as the *tohka* of Champāran, but much longer and with the screen arrangements of bamboo rods more open. The trap measures 4′ 9″ in length, 2′ 7″ in height, and 1′ 2″ broad.

It is called *tehoka* in Muzaffarpur.

115 A trap less compressed than the *tohka* of Champāran and measuring 3′ 2″ × 1′ 2″. It is nearly cylindrical throughout and is strengthened by hoops, but the close end is triangular, and through it the fish are removed. It has the same arrangement of pointed bamboo splints as the *tohka*, but they are further removed from each other.

It comes from the Jessor district, and is called *doair*.

116 *Ghonee.*—A nearly tubular trap, measuring 1′ 10″ × 8″ in diameter at the mouth, resembling the *doair* of Jessor, but called *ghonee* in the 24-Parganās.

QUADRANGULAR TRAPS.

A.—Entrances protected internally by sharp bamboo points.

117 *Aineh.*—A trap made of split bamboos tied together with the fibre of the peduncle of the leaf of *Borassus flabelliformis*, but 0″·40 apart from each other. It measures 2′ × 1, 1″ × 11″. The opening is in the end of the trap and measures 3″ in breadth, its height corresponding to that of the trap 1′ 1″. Internal to the opening on each of its sides is a screen of long pointed bamboos placed longitudinally. At 9″·50 from the opening, the trap is divided by a partition with a similar door. The opening to remove the fish is at the upper right-hand corner at the far end of the trap.

It is called *aineh* in the 24-Parganās, and is set in a stream frequented by small fish.

118 *Aineh.*—Another, but smaller, and measuring 1′ 9″ × 1′ × 9″.

119 *Aineh.*—Another, still smaller, measuring 12″·50 × 8″ × 3″·75.

120 *Aineh.*—Another *aineh* measuring 1′ 1″ × 10″ × 10″.

121 *Aineh.*—Another *aineh* measuring 1′ 5″ × 1′ × 7″.

122 *Aineh.*—An *aineh* measuring 1′ 7″·50 × 1′ 6″ × 10″.

This differs from the foregoing *ainehs* in having four external openings, but only one door in the inner partition.

123 *Dhoohna.*—A trap on the same principle as the *aineh*, but with the bamboo slips finer and the interspace very narrow. It measures 1′ 7″ × 10″·50 × 9″.

Only very small fish are caught in this trap, which is called *dhoohna* in the 24-Parganās.

124 *Khora.*—Differs from the *aineh* in having an opening at either end and not being divided in the middle. It measures

1′ 1″ × 10″·50 × 5″·50. This form of trap is used after rain, when the channels dividing paddy and other fields are filled with water in which there is no current. The trap is simply placed vertically in the channel, and small fish enter it at either door.

It is known as *khora* in the 24-Parganās.

125 Another *khora*, measuring 1′ 2″ × 11″·50 × 12″·50. It differs from any of the previous traps in having a vestibule 6″·50 deep and 6″·50 broad, terminating internally in a screen, on either side of which is a door or aperture of the usual character, protected on each side internally by a loosely suspended array of pointed splints of bamboo.

From the 24-Parganās.

126 Another, but differing from the foregoing in its vestibule being triangular, and in the absence of a screen terminating it, and in the presence only of one aperture situated at the apex of the triangle. It measures 1′ 1″ × 9″ × 12″·75.

From the 24-Parganās.

127 *Khora.*—Another, resembling the last in construction, but measuring 1′ 3″·50 × 1′ 1″ × 1′ 2″.

From the 24-Parganās.

128 *Khora.*—Another, measuring 1′ 2″·50 × 1′ 0″·50 × 1″·50.

From the 24-Parganās.

129 A trap measuring 19″ × 12″·25 × 13″ with a vertical opening at one end, which is turned towards the stream, the stream being closed up to its sides by split bamboos, so that the fish are directed towards the opening, which is about one inch and a half in breadth. A vertical screen of fine bamboos placed longitudinally, is loosely suspended at the sides of the opening, in the interior of the trap, being sharply pointed at the inner ends. The fish finding their way in are prevented passing out by these screens. The fish are removed at one of the corners at the other end of the trap, which can be opened and the fish shaken out.

The trap comes from Motīhāri, where it is called *ghana*.

130 Another measuring only 30″ × 19″ × 5″.

It has a special name in Muzaffarpur, where it is called *surgla*.

131 *Baney*.—A trap measuring 16″ × 15″ × 9″ with an opening at either end of the same character as the aperture of the *ghana* of Motīhāri, which this trap resembles.

In Jessor it is called *baney*.

All kinds of fish are caught in it.

132 *Khaduni*.—A trap like the foregoing, but measuring 20″ × 28″ × 14″·50. Small fish, such as *Saccobranchus fossilis*, *Anabas scandens*, etc., are trapped in it.

From Jessor, where it is called *khaduni*.

133. A trap of fine split bamboos measuring 19″ × 12″·50 × 13″. There is only one opening measuring externally 5″, but diminishing at a distance of 2″·50 to 3″·50. From the vertical inner margin of the opening a loose framework of finely split bamboos, 7″ long, and with free sharp points internally, is suspended. The frame is arched above, and its two sides are tied together below.

It resembles the *ghana* of Champāran, and in Muzaffarpur is known as *arsi*; a somewhat similar trap, but without the long pointed bamboos, being called *arsi* in Motīhāri.

With narrow simple openings for fry.

134 A trap measuring 13″·50 × 10″·25 × 7″ for catching fry, with the two sides inwardly bent near their middle, and one or two of the erect slips of bamboo, of which the trap is made, being imperfect to admit the fry. The trap is placed in the course of a stream, and the channel is closed at the sides with mud or by a bamboo screen. The fry find their way in both from above and below stream, but failing to find an outlet are caught in the trap. The fry are shaken out at one of the corners of the trap, which is only loosely fastened.

It is used chiefly for the fry of the *puttee*, *Barbus chagunio*.

From Motīhāri. Its native name is *arsi*.

135 A trap resembling the *arsi* of Champāran, measuring 1′ 3″ × 7″ × 6″·50, an aperture on each side in the height of the trap 1′ 3″.

It is called *hoochna* in the 24-Parganās.

136 Another resembling the *hoochna* and *arsi*, but with a very narrow

aperture on each side. It measures 11″·50 high, 9″ broad, and 6″·50 in depth.

It is called *ghonee* in the 24-Parganās.

137 *Bassā.*—A trap measuring 32″ × 19″·50 × 7″, with two elongated openings on one side and one on the other, of the ordinary simple character.

It is called *bassā* in Puri.

138 A trap resembling the *arsi, rabani,* and *bilte,* but with two apertures on one side and one on the other.

It measures 27″ in length, 10″·50 in height, and 9″·50 in breadth.

In Cuttack it is called *bhoja.*

139 *Bilte.*—The same as the foregoing, but measuring 22″ × 15″ × 8″.

Manufactured by Bagdis and Chandals of the Nadiyā district, where it is known as *bilte.*

140 *Rabani.*—Another measuring 22″ × 15″·25 × 5″·50.

Called *rabani* in the Jessor district.

141 *Ghuni.*—Another resembling the foregoing, and measuring 31″ × 20″ × 6″, and called *ghuni* in Jessor.

142 A trap measuring 5′ long, and triangular in vertical section, the height being 20″ and the breadth at the mouth 7″·25. There are three elongated narrow openings on one side with little flat pieces of bamboo inserted, but having considerable openings between them.

It is called *dhauli* in Puri.

Traps of Other Forms.

143 *Dhaur.*—A V-shaped trap, the sides measuring 2′ 4″, and the arms below separately 1′ 1″ in length, the aperture to the trap being 2″ broad and 1′ high. It has the usual loose screen of pointed bamboos internally.

It is called *dhaur* in the 24-Parganās.

144 *Dhaur.*—Like the foregoing, but truncated, and measuring 1′ 2″ along the sides, 1″ high, and the vestibule 8″ in length.

From the 24-Parganās.

145 *Doob.*—A small trumpet-shaped trap let into a short cylinder, the whole trap measuring 2′ 1″·50 long and the trumpet mouth 1′ 2″ in diameter. The cylindrical portion is only 11″·50 long and 4″·50 in diameter, and when fish have to be removed from the trap it is taken off the trumpet-shaped mouth, inside which there is a funnel-shaped entrance terminating in a narrow orifice, which fish cannot pass once they have entered.

It is called *doob* in Chittagong, and this kind of trap is sometimes made 7′ in length.

146 *Ram chai.*—A spindle-shaped trap made of finely split bamboo, and measuring 3′ 4″ in length with a maximum diameter of 8″·25. The slips of bamboo are bound together with spiral bands of ratan, but leaving interspaces of about 0″·10 between them. There are two openings on one side in the form of narrow tubular orifices, one leading to one end of the trap and the other in the opposite direction, and tapering to a narrow internal aperture surrounded by the loose ends of the bamboos from the wall of the opening.

One end of the trap tapers to a point, whereas the other ends in a circular orifice about 3″ in diameter, which is closed with a wisp of straw when the trap is in use, and which is removed when the fish have to be taken out.

It is called *ram chai* in Chittagong.

147 *Dhowree.*—A trap of 3′ 5″ in length, 9″ high, and 5″·50 in breadth. It has a general resemblance to a miniature toy-house with a sloping roof and with two windows on one side and three on the other. The floor of the trap and its two ends are made of bamboo slips about 0″·35 broad, whereas the remainder is constructed of very fine slips of bamboo with narrow interstices between them, and measuring less than one-tenth of an inch in thickness. The walls are kept apart by a strong bamboo framework within, corresponding to the beams of a house, and the ridge of the roof is also strengthened by split bamboos. A tubular passage leads in from each window. The top of one gable end is open; but as it is above water the fish cannot escape through it, and by means of it they are shaken out when the trap is removed.

It is used only in shallow water, and is called *dhowree* in Cuttack.

148 A mat trap made of the stems of grass tied together by cord, but leaving interstices of 0″·15 between them. It is 31″ broad and 25′ 3″ in length. About eleven or twelve of the stems at each end are rolled and tied together into a bundle and used as a means of holding the net. In the present specimen there is a quadrangular hole about the middle measuring 4″·50 × 3″.

Dr. Day* has described the use of this trap as follows:—

"In Orissa the salwa or pulti consists of very fine split bamboos bound together by means of grass, the interstices between each piece being equal to one-fifth of an inch or less. This pulti is about 5 ft. high, and is in the shape of a regular wall net. It is taken to a tank and placed in the water in a V form whilst the fishermen on either side extend themselves outwards, and by beating the water drive the fish into the enclosure. The two ends are now brought together, and the fish penned into a small space. The sides are advanced nearer and nearer until they almost touch, and the fish are removed by a hand net or by the hand alone."

In Cuttack it is called *salwa* or *pulti*.

149 A fishing screen made of split bamboos tied together, but with spaces between, measuring 3′ 6″ × 2′ 7″. It is used along with such traps as *bilte, doari,* etc. A few of them are stretched across a narrow stream to prevent the fish passing, and, between two, a *bilte* or *doari* is placed with their mouths against the current.

It is called *bar* in the Nadiyā district.

150 *Pata.*—Another measuring 2″·8 × 1″·8.

Called *pata* in the 24-Parganās.

BASKETS.

151 A truncatedly oval basket 12″ high, with a diameter of 8″·50 at the mouth. It is used by fishermen in hand net fishing, and is either tied round the waist and fixed at the back, or slung over the arm. The fish are placed in it as the nets are emptied.

It is called *khalai* in the Murshidabad district.

152 A basket for holding fish, made of split bamboo, and with a

* "Fish and Fisheries of India," 1873, page 66.

diameter of 15″ at the middle and 10″ at the mouth, with a depth of 11″·50. It is carried by a rope handle, and is tied round the waist in fishing.

It is known as *daylee* in the Muzaffapur district.

153 Basket made of split bamboos and used by fishermen in hand net fishing. It is tied round the waist and fixed at the back, and the fish are placed in it as the net is emptied.

Measurements: height 14″, greatest diameter 13″·50, width of the mouth 10″.

Called *daili* at Motīhāri.

154 A small basket measuring 6″ deep and with a diameter at the middle of 8″·50, but tapering upwards to the mouth, which is 4″ broad. The narrow mouth is to prevent the small fish, such as *singi* and *koi*, jumping out.

It is called in Nadiyā, *khalui*.

155 An elongated tubular basket with a cord attached to it and carried over the shoulder.

From Chittagong.

156 A vase-shaped basket with a short foot; height 9″, diameter of mouth 5″, greatest diameter at middle 7″·50.

From Chittagong.

157 A round basket made of bamboo, with its cover, and measuring 11″ high × 1′ 9″ in diameter. It is used for carrying fish to market, and the cover is removed and the fish exposed on it for sale.

The basket is called *panjah*, and the cover *dala* in Nadiyā.

158 A fish basket made of split bamboo, measuring 30″·50 in diameter at the base, its broadest part, and 20″ at the mouth, with a depth of 16″·25. The same as the *panjah* of Nadiyā and used for holding fish as they are caught, and for carrying them to the market. It is provided with a flat circular cover or *dala*, strengthened by a hoop round the margin forming a rim on one side.

From Jessor.

159 A small basket resembling a *panjah*, measuring 6″ high by 1′ in diameter. It has no cover, and in Nadiyā it is called *pete*. It is used for carrying fish in small quantities.

From Nadiyā.

160 A fish basket with a conical cover made of bamboo and palm leaves. The basket is 16″ in diameter and 10″ deep.

From Puri.

161 A couple of simple baskets, one at each end of a bamboo, carried in the hand or on the shoulder.

From Chittagong.

162 One basket similar to the last, but with a handle.

From Chittagong.

FISHING RODS.

163 A fishing rod made of a single stem of *Bambusa balcoola*, 14′ long and with a diameter of 1″·75 at the handle. No reel is used, and the line is tied to the beginning of the upper fourth of the rod, and is made of cotton, hardened and coloured brown in *gab*. It is 12′ 4″ long, and is wound round the rod from its attachment to it up to the tip, about 6′ being coiled round backwards. When the rod is in use, the whole of the line is not unwound from the extremity of the rod to the tip, to which it is secured by two loops being cast round it, but these are so loose that the slightest strain of a fish sets them free and allows the line to be paid out from the free end of the rod. Only one hook is used, and on this line the hook used is of native manufacture. This kind of rod with a short line is used for surface fishing.

From Murshidabad.

164 A rod similar to the last, but with a long cotton line 30′, for fishing in mid-water. No reel is used, and the line is tied to the rod about 4′ from its tip and coiled round as in the last.

From Murshidabad.

165 A similar but more slender rod, 13′ 3″ long and 0″·75 in diameter at the handle. It is also used without a reel, the line

being tied to it much in the same way as in the two former rods only the line is closely twisted round it in three separate places but the terminal arrangement of loose coils and loops also prevails The line is made of silk, and its free portion, which is 23′ long is twisted round the rod backwards when not in use. Two native hooks are attached to this line, and the rod is used for bottom angling.

From Murshidabad.

166 *Barsi suta* and *sip*.—A rod *sip*, 16′ 6″, made of bamboo, with a hemp line *suta* and a country hook *barsi*.

From Jessor.

167 *Chhip*.—An ordinary fishing rod without a reel, and the same as the rods described from Murshidabad. It measures 13′ 8″, and has a silk line made of *hatjhhara*,* *i.e.*, refuse silk, and is provided with a float of the *rachis* of a peafowl's feather or of light wood.

From Nadiyā, where it is called *chhip*.

168 A fishing rod 14′ long, like the last, but provided with a brass wheel, the silk line being passed through brass rings tied on with cotton thread to the nodes of the bamboo. The brass wheel is not well made, and bears the following mark on the handle: O.C.D., 1880, St. Johany.

From Nadiyā.

169 A fishing rod of bamboo, ornamented with fire marks and measuring 12′ 3″. It has a brass reel of country manufacture tied on to the extremity, and a line made of twisted tussah-silk, with two country hooks, and a float made of the quill end of a peacock's feather.

From the 24-Parganās.

170 Another similar rod, but without a wheel, and measuring 14′ 11″·50. It has a silk line attached, and wound round the rod in the usual way, and a peacock's feather float.

From the 24-Parganās.

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* Literally, thrown away by the hands.

171 A small bamboo rod 7′ 8″ long, without a wheel, and with a very fine line, small hook, and float, for catching prawns and small fish.

From the 24-Parganās.

172 A slim bamboo rod, 11′ 2″. The cotton line has one large hook, and a long grass float.

It is called *chip* at Patna.

173 A small fishing rod and line, the former measuring 5′. The line is made of the fibre of *Sanseviera zeylanica** and covered at intervals with small floats made of a feather stem.

From Puri.

174 *Jota.*—A piece of bamboo, 8′ long and about 1″ broad, is fixed under water up to 6′. A small brass bell is attached to the end above the water, and 2′ below this a nest of straw, oval in form, with the inner and lower end of the cavity of the nest cut across, so that the bait which the nest holds will not fall out; but before this is done a hook, which is attached to the end of the strong line of a coarse bamboo fishing rod, is loosely fixed among the cut ends of the straw, so that the barbed pointed end of the hook is directed upwards. The line is then cast over the upper end of the immersed bamboo over the bell, and the fisherman standing on the bank, whenever he hears the bell tinkling, is aware that a fish is nibbling at the bait, and accordingly gives a rapid upward jerk to his line, hooking the fish in the chin. Ordinary ground bait is used, and this curious contrivance is employed in the capture of *Wallago attu.*

It is called *jota* in Calcutta and its neighbourhood.

SPRING ROD.

175 A bamboo 12′ 7″, set as a spring rod. It is provided with a strong line 7′ 6″ long, tied to the rod 2′ 6″ from its tapered extremity, round which it is coiled, and loosely secured to the tip by a loop knot. It ends in a large native hook, and about 8″ above the hook a thin piece of bamboo 6′ long is tied on to the line, there being a notch at the lower end of the bamboo. The lower part of

* Identified by Dr. King, who informs me that the Bengali name is *moogo.*

the rod is driven into the bank and then pulled down by the line, so that the notched bamboo attached to the line will catch against a notch at the top of a bamboo post 3′ high, and fixed in the bed of the stream or tank, and submerged to within 6″ or so of its summit, the hook hanging down into the water for about six inches.

When a fish has laid hold of the hook the tension on it frees the little bamboo from the post, and the rod springs upwards and backwards with great force.

From Nadiyā.

FISHING ROPE.

176 A rope made of jute, for general use.
From Murshidabad.

LINES.

177 *Tuggis* or *Lines.*—Two hand-lines, made of silk and of great length, wound round a teak roller 6″·50 long and 1″·10 in diameter, the ends of which are ornamented with Benares lacquer. The roller is perforated longitudinally for the reception of the bamboo stick round which the roller revolves, the stick being driven into the margin of the tank or stream. A good many yards of the first portion of the line are saturated with *gab* to protect it against injury from the action of the water, whilst the remainder is red in colour from saturation with some other preservative.

Each line is provided with two hooks of native manufacture and with a lead weight: also with a piece of bamboo having a long notch at one end. After the line has been paid out this piece of bamboo is fixed into the earth in front of the roller, and a loop of the line is loosely thrown through the notch, the object being to acquaint the fisherman at once when a fish is hooked, as the slightest traction pulls out the loop.

All kinds of large fish are caught with these lines, which are known generally as *tuggis* or hand-lines.

These lines are from Murshidabad.

178 Another line on a wooden reel with lacquered ends, and with its stick for revolving on, also the notched stick. This line, although much stronger than those above described, being fully four times as

thick, is also made of silk cord prepared with *gab*, and has a heavy weight attached, and a large hook. Frequently these lines are used for fishing by moonlight, and on dark nights a fire-fly is occasionally fastened on a float attached to the line, and from the movement of the float the angler ascertains the presence of a fish nibbling the bait.

Also from Murshidabad.

179 A ground-line for catching large fish, made of hempen cord, 70′ long, and provided with ninety-two large hooks at nearly regular intervals throughout its length, and with leaden sinks.

It is known at Murshidabad as *dhaunī*.

180 A line consisting of a wheel, *ghurnee*, a piece of cord line, *tuggee*, with its sinker called *seesa*, and its hooks, *bansi*. The line is of English cord, but it has been soaked in *gab* in order to preserve and strengthen it.

181 A fishing line prepared with *gab*, and with one hook and a lead sinker, and made of cotton.

It is called *dore* in Patna.

182 A much laterally compressed wooden reed with a cotton line, sinkers, and two native hooks. It is perforated for a stick on which to revolve and is furnished with its notched bamboo for fastening the line when paid out.

It is called *sherista* in Nadiyā.

183 A hand-line wound round a long internode, 15″ of a bamboo, ornamented by fire marks and revolving on a bamboo stick. The line is made of hemp and has a lead sinker and one barb of native manufacture.

From the 24-Parganās.

184 A long cotton line treated with *gab* and provided with a large native hook, and a brass and lead sinker. It is wound round a gourd.

It is called *dor* (string) and *bansi* (hook).

185 Two fishing lines made of tussah-silk, one with hooks of English manufacture.

From Calcutta.

186 A sea fishing line with large hooks, and with a big iron nail for fixing it.

From Puri.

187 A smaller sea line with hooks.

From Puri.

FISHING SPEARS.

188 A fishing spear 6 ft. in length made of ten spears tied together for 21 in., the remainder free. It is used in shallow or deep water, and from a dug-out canoe, in spearing all kinds of fish that swim near the surface.

From Motīhāri. Native name, *surhut*.

189 A spear resembling the compound spear from the Champāran district, but consisting of sixteen separate spear-points, each shaft being 4′ 3″ long. Above the point of divergence they are all closely applied to one another, forming a sharp-pointed cone, and firmly tied together. Over this is fastened another piece of bamboo 20″ long, split throughout one-half of its length into four pieces, which embrace the conical end of the compound shaft. The iron spear-points are not barbed and measure only 1″·50.

The uses are the same as those of the Champāran spear. It is called *konch* in Nadiyā.

190 A spear 4′ 10″·50 long, with twelve points, and thus resembling the *sarhut* of Champāran and the *konch* of Nadiyā.

In Muzaffarpur it is called *sahut*.

191 Another resembling the foregoing, but without the split bamboo embracing the conical end which is bound by thin iron rings.

From the 24-Parganās.

192 A spear with a coloured bamboo shaft 14′ 5″ long, terminated by

seven iron barbed points, six radiating from the base of a central point which has two barbs.

From the 24-Parganās.

193 A spear with a shaft of blackened bamboo 10′ 10″ in length, and terminated with seven slightly divergent iron points 7″ long, two of them being barbed. It is used for spearing fish, such as *Wallago attu, Ophiocephalus marulius,* and *Macrones aor.*

It is called *pachkha* at Patna, a name that is applied to spears of this kind irrespective of the number of iron points.

194 Another with a shaft 10′ long, but with eight unbarbed points 8′ long.

It is used for the same purpose as the latter and is similarly named.

From Patna.

195 A spear terminating in five singly-barbed points 6″ long and fixed into a bamboo shaft 10′ long. The barbed points are fixed into a piece of wood that fits into the end of the shaft, and the two are connected together by a long cord wound round the lower part of the shaft.

It is used like the *ekari* for spearing turtle and also large fish.

It is known as *pāchkā* at Sāran.

196 An iron rod, 5′ 1″·50 long and 0″·23 in diameter, with a small loop at one end and a doubly-barbed point at the other. About 16″ of the iron are tied firmly on to one end of a bamboo about 8′ long and secured by the loop so that it does not slide.

It is known as *sahut* in the Muzaffarpur district and is used for spearing turtle.

197 A harpoon, 9′ 3″, with a doubly-barbed iron point 9″ long and fastened into the end of the *sál* wood which, in its turn, is fixed into the end of the shaft. A long cord is tied to the wooden portion of the spear-point and round the shaft, and secured to its opposite end. When the spear has struck a turtle the point falls out and the stem floats on the surface, when it is followed by the boat and taken up by the fisherman, who pulls in his prize.

It is called *ekári* in Sāran, where it is only used for fishing turtle. Similar spears are also used all over the Indian rivers.

198 An *ekári* point with one barb.
From the 24-Parganās.

199 A spear with a shaft 7′ 4″ and a simple point 5″·50 long. The bamboo shaft is ornamented like some of the foregoing ones with black marks by means of a heated iron rod.
From the 24-Parganās.

200 A spear, measuring 12′ 3″, with four iron barbs. The iron points are bound round a cylindrical piece of wood which is fixed into the end of the shaft, but so loosely that it falls off when a fish is struck, but it is kept in connection with the shaft by a cord about 3′ 3″ in length, which is tied to its lower end.
The spear is called *atar* in Nadiyā, and *chabrack* in Jessor. It is used for spearing *Labeo rohita, Catla buchanani,* turtles, and crocodiles.

201 *Spear.*—A fish spear with a shaft 10′ 3″ in length, and terminated by four barbed prongs in one plane, the outer pair being 8″ long and the inner 4″.
From Puri.

202 A spear with a fire-marked bamboo shaft, 17′ 8″ in length, terminated by six barbed iron points on a common plane, and with a common base, each measuring 3′·50.
From the 24-Parganās.

203 A six-pointed spear, 12′ 8″ in length, the stem being made of bamboo. The six points of the spear are fixed on to as many pieces of bamboo measuring 15″, and which are kept apart from one another, in their lower thirds, by a piece of the node of a large bamboo notched at its sides and perforated in its middle, the notches to steady and keep apart the five outer pieces carrying points, and the perforation for the reception of the central piece. These pieces of bamboo are thin, in close apposition below, but widely divergent

at their free ends, which carry spear points. Their upper extremeties are fixed into the bamboo shaft which is strengthened for their reception by being bound with cotton cord. Each point carries a barbed iron point 6″ long. They are tied together in pairs by a string about 3′ 4″ long, which is bound by its ends to their bases. The three ends are tied around the shaft, about 1′ 6″ from its lower end, leaving a sufficient length for the iron barbs to be fastened to the bamboo points.

The spear is held by the upper end, which rests on the upturned right palm, the index finger being applied to the tip, and the left arm outstretched, and the spear resting on the left hand. The knees are then slightly bent, and the body thrown backwards, and then by a sudden forward movement of the body and arms, the spear is projected on the fish.

In the Nadiyā district this spear is called *tenta* where it is used for spearing large fish, turtles, and crocodiles.

204 A spear like the preceding from Nadiyā, and with six iron barbs and a similar arrangement for fixing them on to their bamboo points. These points, however, being much longer than in the former have the cords which are tied to the iron barbs attached to their middle, and then continued backwards to be tied to the shaft, which is 13 ft. 7 in. long. The bamboo sticks having the iron spear points are arranged differently from the Nadiyā spear, as they are not kept apart by a piece of bamboo introduced among them, but by their lower ends being considerably thicker than the free ends, and by being grouped round the central stick. They measure 29 in. and the iron spear-heads 6 in. The latter are made in India.

The spear is called *junti* and is used for spearing large fish, turtles and small crocodiles.

From Jessor.

FLOATS.

205 Three floats for rod and hand-line fishing made of the *rachis* of the largest feathers of *Pavo cristata*, and measuring 4″·75 long and 0″·25 in thickness.

From Murshidabad.

205 (*a*) *Shola* floats for supporting fishermen in the water consisting

of thirty-nine pieces, each 1 ft. 10 in. and tied together by hempen thread.

206 Two floats made of the stems of a reed or grass measuring 5″·25 in length and 0″·30 in diameter and used for rod and line fishing.

From Murshidabad.

207 Four small *shola* floats, each consisting of three pieces of the stems of *Aeschynomene aspera* tied together at the ends and measuring 6″·75 in length and 0″·75 in thickness. They are used in floating nets and vary in dimensions according to the dimensions of the net.

From Murshidabad.

HOOKS.

208 Ten steel hooks of different sizes, from 1″ to 0″·40 in length. They differ from the English hook in being more curved.

From Murshidabad.

ROD-FISHING APPLIANCES.

209 *Fishing Box.*—An iron box, 14″ × 11″ × 9″, with five compartments used by Calcutta anglers. In the four compartments, a supply of bait, floats, and hooks is carried. In the large compartment, the Bengali disciple of Isaac Walton stores his food for the day, his tobacco made into a paste with molasses, his earthen pipe bowl or *kulika*, the charcoal cakes for kindling the moist tobacco, and his Bryant and May's matches. The never-failing *hookha* is carried in the hand.

From Calcutta.

GROUND BAITS.

210 *Baits.*—The following substances are generally used as ground baits in Bengal, viz., *guruttuck* = the bark of *Cinnamomum*; *burra methi*, the seeds of *Trigonella fœnum-grœcum*, L.; *khoodie methi* = the seeds of another variety of *T. fœnum-grœcum*, L.; *khullee* = oil-cake; seeds of the cotton plant, *Gossypium herbaceum*, L.; *chura* = a rice paste dried and broken into fragments; seeds of *Sesamum orientale*, Wild.; and *chikna matti* = a plastic clay. All the seeds,

etc., are parched on the fire, and then pounded together and mixed with clay and water into a paste, which is highly pungent and aromatic. This bait is either thrown into the water by the fishermen while fishing, or it may be deposited in masses in the water encased in a split bamboo driven into the bed of the tank or stream, some feet under water, and in this case the slim top of the bamboo projects above the water, and being tipped by a feather the movements of the latter indicate when the fish are nibbling the bait, and the rod line is used over the spot, the hook being baited with a paste of flour and ghee, or decayed cheese mixed with clay, or bread and fresh cheese.

In Calcutta some other substances are also used, one mixture consisting of the seeds of the mustard plant, *Brassica juncea; kallajeera* = the seeds of *Nigella satwa; tambul* = the seeds of *Zanthoxylon; chota methi* = the seeds of *Melilotus parviflora; akangee,* the stems of *Kæmpferia galanga,* L.; and *ghore-boch,* the stems of *Acorus calamus,* L.; and another consists of boiled rice, chaff, and the seeds of *T. fœnum-græcum* boiled together.

All these ground baits above-mentioned are used for *Catla buchanani, Labeo rohita, Labeo calbasu,* and *Cirrhina mrigala.*

From Murshidabad.

BAITS FOR HOOKS.

211 *Baits.*—The *pupæ* of the large silk-worm moth, called in Bengalee *chookree* and considered a good bait for all fish.

From Murshidabad.

212 A species of earth-worm common in Bengal, and called *kenchoo,* and also *bhuie lanta,* which means ground creeper.

From Murshidabad.

213 A small prawn used as bait for large prawns and *Cirrhina mrigala.*

From Murshidabad.

214 Cockroaches also used as bait, but chiefly for predaceous fish. The insect is not impaled but tied on immediately above the hook,

and the hook and insect are dipped about 3 to 4″ in the water. The fish chiefly captured is *Wallago attu.*

From Murshidabad.

215 The young of *Ophiocephalus marulius*, and *Barbus stigma* used as hook bait.

From Murshidabad.

APPLIANCES FOR GROUND BAIT.

216 A bamboo stick 9′ 11″ in length and very slender towards its upper end, to which a white feather is tied. A bait made of aromatic substances is mixed into a paste and tied on to the stick about 6′ from its lower end. The stick is then taken out into the tank or still water in which it is used, and fixed to the bottom, the feathered end standing up out of the water. The fish are attracted by the aromatic odour of the bait, and nibbling it, cause the feather to vibrate. The angler then casts his line in the neighbourhood of the bait-stick.

From Murshidabad where it is called *chár katee.*

217 Another and similar stick 8′ 10″.

From Murshidabad.

218 *Arrah.*—A piece of a bamboo 1′ 9″ long and 1″ diameter, split near the middle longitudinally into thirteen narrow pieces, between which the ground bait is inserted, the ends of the bamboo being entire. A fine bamboo wand, 5′ 1″·50 long, is set loosely into the upper end, and the lower end is fixed, also loosely, on to a stake driven into the bed of the tank. The fish nibbling the bait causes the upper part to shake, thus indicating their presence to the fisherman.

It is called *arrah* in Calcutta.

LINES WITH HOOKS.

219 An appliance consisting of a piece of bamboo 17″ long and 0″·50 in diameter, to which a number of short cords are tied, each ending in a small hook made of a fine splint of bamboo with a thorn tied on to it obliquely and completing the hook, which is only attached to the cord at the point where the thorn is fixed to the bamboo splint.

By means of the sharp thorn the hook is passed through the side of the mouth of the fish, and the piece of bamboo is fastened between the two vertical sticks close to the water in which the fish are immersed.

It is called *mah* at Murshidabad.

220 Another specimen, also from Murshidabad.

DIVISION IV.

BOATS AND CANOES.

221 *Botee boat.*—A fishing boat 28′ long, 7′ broad at the middle, and with a depth of 2′ at the centre. There are twelve ribs on either side, eleven battens on the bottom of the boat and ten small lateral battens connecting the bottom and the sides. There are ten cross ties, resembling seats, and on these, and on the pieces of wood running round the inner margin of the boat, the deck, consisting of split bamboos netted together, rests. The bottom is very flat and measures 5″. It is occasionally fitted up with a mast and a square sail of very flimsy cloth, made of jute or of cotton; but when used for fishing, only two oars, and an oar-like rudder of very primitive make, are employed, the paddle being roughly made of wood, to which a bamboo is lashed as a handle.

From Patna, where this form of boat is called *botee*.

222 A fishing boat, measuring 35′ 3″ in length and 5′ 2″ broad at its middle, where it has a depth of 2′ 1″, the stern end of the boat being raised 3′ 11″ and the prow 2′ 10″. The bottom of the boat is flat for 1′ 10″·60 at the middle, in which there are four planks. At the stern and prow of the boat 3′ are covered in with planks, the remainder being perfectly open; but when the boat is in use for fishing, it is temporarily covered with split bamboos, which are quite easily removable. These rest on a piece of wood that runs along the inner margin of the boat, and which is fastened to ribs, which are nine in number, but which are not continued on to the flat bottom,

their place being taken by nine cross battens alternating with the ribs. Thirteen cross pieces, like the seats of a boat, hold the sides together. The planks are clamped together by nine iron clamps to a foot. Instead of being tarred, the boat has been painted with *gab*.

In fishing, no sail is used with this boat, which is propelled by two oars and a long helm, in the form of an English oar. The oars are 7′ in length, and the paddle portion, which is convex on one side and flat on the other, is made of *sál* wood, *Shorea robusta*, and the handle of bamboo.

The general form of the boat recalls the boat of the ancient Egyptians.

This boat is from Jessor.

223. A model of the ordinary fishing boat that is used with *behandi* and other nets, and which is generally made about 35′ long. The model is 6′ 3″·50 long, 11″·50 in breadth at the middle, and 7″·50 high. It is provided with two paddles and a helm.

From Chittagong.

224 A model of a fishing boat 5′ 6″·50 long and 9″·75 broad and 6″·50 high at the middle. Fishing boats of this kind are generally 24′ in length.

It is fitted up with a bamboo platform on one side, behind which a bamboo projects out into the water with palm leaves attached to it, forming a kind of broom. This frightens the fish, which jump on to the platform, one half of which is in the water, as the fisherman sits with one leg outside the boat; and from the platform they spring into the boat, the bottom of which is covered with leafy branches, so that they do not escape. In leaping from the platform into the boat they are prevented from clearing the boat by a net which is fitted up obliquely on the opposite gunwale. The prow of the boat is kept well down in the water by being weighted with stones or with sand.

From Chittagong.

225 A canoe dug-out, or *donga*, made of the stem of *Borassus flabelliformis*, or *tāṛ* palm. All the soft portion of the palm stem has been excavated, only the hard outer layer remaining. The broadly expanding base of the stem forms the prow or fore-part of

the canoe, and has a diameter of 2′ 4″, while the narrow posterior portion is not more than 11″ broad, the total length of this rude boat being 12′ 10″. The water is prevented from entering posteriorly by a part having been left unexcavated.

From Jessor, where it is called *donga*.

226 A canoe, or dug-out, made of the trunk of the *semul* tree, *Bombax malabaricum*, and measuring 23′ long, 1′ 10″ broad, and 1′ deep, the bottom being flat externally and internally, the sides vertical, but the ends massive and sloped down internally. At either end a small ridge has been left on the bottom simulating a rib. This is the boat from which the *lahotree jāl* is generally used. The present boat is fitted at the prow with the necessary appliances for the net.

One paddle of teak wood is used, measuring 6′ 5″, of which the expanded portion measures 2′ 10″ × 6″ broad. The boatman either stands or sits on the bottom of the boat at the prow or stern, using the oar from side to side at each stroke.

It is called *ekta* in Patna, meaning one.

BALING INSTRUMENTS.

227 A wooden scoop painted green and margined with red. Length with handle 3′ 4″·50, the scoop being 1′ 0″·75 long and 2″·75 deep. The handle is fastened on to a cross piece of wood over the inner third of the scoop, and a cord is attached to it, which is held in the left hand, and by the swing it gives, the scoop, held in the right hand, is propelled forwards and upwards.

It is used in baling large boats.

From Patna.

228 Another and similar, but smaller.

From Patna.

FISHING RAFTS.

229 Two fishing rafts, made each of three large bundles of *shola** 4′ 2″ long, the breadth of the raft being 4′ 3″. The bundles are

* *Aeschynomene aspera*, Linn. I am indebted to Dr. G. King for this identification.

tied at the ends, and the three are bound together, and over them there are placed two old bhangy sticks, to which they are also secured by coarse cord made of jute or cocoanut fibre. The fisherman squats down with one foot on each piece of wood and steers, and paddles himself with the short oar. The raft is used in superintending fishing operations with large drag nets in tanks and in shallow water, and in throwing the *khepla jāl*, or common casting net.

They are known by no other name than *shola-marh*.

From Calcutta.

230 A *shola* float measuring 20″ × 5″·50.

From Puri.

DIVISION VI.

RAW MATERIALS FOR MAKING LINES.

231 Five masses of tussah-silk, consisting of the unwindings from the outer layers of cocoons.

Calcutta.

232 Three similar masses damped and twisted into hanks.

Calcutta.

233 Twenty Y-shaped sticks with the unwindings of the fine inner layer of tussah cocoons.

Calcutta.

234 Twenty specimens of lines made of tussah-silk. They have been made by the spindle and whorl, the thread being rubbed against the right thigh to set the whorl a-spinning.

Calcutta.

235 A plant of *Sanseviera zeylanica*, the fibre of which is used at Puri for making fishing lines.

From Puri.

APPARATUS FOR MAKING NETS.

236 *Takur.*—A spindle and its whorl for making twist for nets. It consists of the disc-like whorl called *patuna*, of the spindle *shaula*, and of the cotton twist *shuta*. The notched end of the spindle is known as *kani*.

From Calcutta.

237 *Phal-katti.*—The apparatus for making nets consists of a small piece of bamboo, called *phal-katti*, varying in dimensions according to the size of the mesh to be made, one portion being expanded the size of the mesh, with a narrow handle, as it were, on which the meshes are stored as they are made. The largest exhibited is 7″·50 in length. The other, the needle of bamboo, is called *torokhool*, and is long and narrow with a deep notch at each end for the reception of the thread or cord which is wound round it. The net is begun on a piece of string, either tied round a post, or more generally grasped by the great toe of the fisherman who is squatted on the ground. The piece of string is called *bhandhan*.

From Calcutta.

238 *Phal-katti, i.e.*, the stick that yields results. Two other pieces of better workmanship, the needle exactly resembling a crotchet needle.

From Calcutta.

239 *Phal-katti* and *patuna.*—Two other specimens of smaller size.

From Calcutta.

MATERIALS FOR PRESERVING NETS, LINES, AND BOATS.

240 The preparation is thus made—

Gab.—The gummy juice of the fruit of *Diospyrus embryopteris* is used in tanning, and when it has been prepared as follows, the decoction is used for preserving fishing lines and boats against the action of water.

The fruits of *Diospyrus embryopteris*, *D. melanoxylon*, *Acacia arabica*, and of *Terminalia citrina* are broken up in the green state

and pounded together along with the barks of the following trees, viz., *Acacia arabica* and *Terminalia arjuna*. A little water and mustard oil is added to the mixture, and it is then boiled in an earthen vessel. It is then allowed to stand for two or three days, and after that the liquid is strained off for use.

A net to be prepared is placed in an earthen vessel and the solution is poured on it, and the net is allowed to remain in the solution for twenty-four hours.

241 A sample of *gab* so prepared.
From Calcutta.

242 A sample of the fruit of *Diospyrus embryopteris*.
From Calcutta.

243 A sample of the fruit of *Acacia arabica*.
From Calcutta.

244 A sample of the fruit of *Terminalia citrina*.
From Calcutta.

245 A sample of the bark of *Acacia arabica*.
From Calcutta.

246 A sample of the bark of *Terminalia arjuna*.
From Calcutta.

GRASS FOR TYING TRAPS.

247 A specimen of the grass that is used in tying together the fine bamboo splints of which various traps, etc., are made. The grass is supposed by Dr. King to be a species of *Saccharum*, probably *kush* grass, *S. spontaneum*.
From Murshidabad.

DIVISION XXI.

KNIFE FOR CUTTING FISH.

248 *Bhontee.*—An iron blade 13″·50 high and 3″ broad fixed on to the end of a piece of flat wood, to which the blade is placed at right angles. One foot holds down the wood, and the fish are pressed downwards against the cutting edge, which is towards the person using the knife.

It is called *bhontee.*

From Calcutta.

FISHERMAN'S COOKING APPLIANCES.

249 A fire-place used by fishermen for cooking food. The basement is an earthenware vessel, round the margin of which a clay wall is built consisting of three eminences surrounding the cup-shaped cavity of the vessel, in which the fire is placed, and which is also covered with clay. The eminences are for the support of the earthenware cooking vessels, two of which accompany the fire-place or *chula.*

The deeper vessel is used for cooking rice, and is not glazed in the inside, whereas the shallow vessel is partially glazed, and is for frying fish. The glaze in the inside of the latter is said to prevent its cracking, which it would do if it were not glazed. The shallow earthen vessel is the cover, and is called *saura.*

From Calcutta.

FISHERMAN'S SPOON.

250 A spoon made of wood, and with a long handle, and used in cooking food.

It is called *hattah.*

From Calcutta.

FISHERMAN'S OIL FLASK.

251 A small earthen flask for holding mustard oil for cooking, used by fishermen.

It is called *tali.*

From Calcutta.

LAMP.

252 A leaf-shaped clay lamp called *peedeem*, in which a wick saturated in castor oil is burned.
From Calcutta.

DIVISION XXVI.

PRESERVED FISH.

Fish dried in the sun and preserved with salt.

PERCIDÆ (PERCHES).

Ambassis ranga.

253 (283) Occurs throughout India and Burma.

254 (284) Native name (Bengali), *chanda* or *chandee*.

255 (285) Calcutta Market.

TRICHIURIDÆ.

Trichiurus muticus.

256 (286) Seas and estuaries, India to China.
Native name (Bengali), *kenkeleh*.
Calcutta Market.

SCIÆNIDÆ.

Sciænoides pama.

257 (287) Bay of Bengal and its estuaries.
Native name (Bengali), *Koi-bola*.
Calcutta Market.

SCOMBRIDÆ.

Scomber microlepidotus.

258 (288) Red Sea to Malayan Archipelago.
Native name, *amlet.*
Calcutta Market.

GOBIIDÆ.

Gobius giuris.

259 (289) East coast of Africa and Sind to Malayan Archipelago: from fresh-water in plains.
Native name, *beliah.*
Calcutta Market.

SILURIDÆ (CAT-FISHES).

Callichrous pabda.

260 (290) Indus and Ganges.
Native name, *pabda.*
Calcutta Market.

SCOPELIDÆ.

Harpodon nehereus.

261 (291) East coast of Africa to China and estuaries of India.
Native name, *bomelo.*
Calcutta Market.

CYPRINIDÆ (CARPS).

Labeo angra.

262 (292) Ganges and Irrawaddy and Sittoung rivers.
Native name, *morala.*
Calcutta Market.

Barbus stigma.

263 (293) India and Burma.
Native name, *gola-punti.*
Calcutta Market.

CLUPEIDÆ (HERRINGS).

Engraulis taty.

264 (294) Seas and estuaries of India and Malaya.
Native name, *tel-sutkee.*
Calcutta Market.

Raconda russelliana.

265 (295) Bay of Bengal and Malayan Archipelago.
Native name, *fasha.*
Calcutta Market.

CYPRINIDÆ (CARPS).

266 (296) *Labeo calbasu.*—Rivers of India and Burma. Bengali mame, *kalbans.*
Chittagong.

CLUPEIDÆ (HERRINGS).

267 (297) *Engraulis taty.*
Chittagong.

268 (298) *Clupea ilisha.*—The *hilsa.*
Chittagong.

NOTOPTERIDÆ.

269 (299) *Notopterus kapirat.*—"Fresh and brackish waters of India to the Malayan Archipelago."—*Day.*
Chittagong.

TRICHIURIDÆ.

270 (300) *Trichiurus savala.*
Chittagong.

STROMATEIDÆ (POMPHRETS).

271 (301) *Stromateus cinereus.*—Seas of South-Western Asia.
Chittagong.

SILURIDÆ.

272 (302) *Macrones aor.*—Rivers of India and Burma.
Chittagong.

273 (303) *Callichrous pabda.*—The *pubda*, Bengali.
Chittagong.

SCOPELEIDÆ.

274 (304) *Harpodon nehereus.*
Chittagong.

PERCIDÆ.

275 (305) *Lates calcarifer.*—The *begti.*
This fish occurs in the seas of the southern coasts of Asia, and is common in estuaries. It is the fish most largely consumed by Europeans in Lower Bengal. It is frequently preserved with vinegar and tamarind fruit, and is then known as tamarind fish.
Chittagong.

276 (306) *Pristipoma olivaceum* and *Pristipoma hasta.*
Common around the coasts of India. The air-bladders are collected and sold to the Chinese, who ship them to China, where they are converted into isinglass.
Chittagong.

FISH PRESERVED IN BRINE.

CLUPEIDÆ.

Clupea ilisha.

277 (253) From the Persian Gulf to the Malayan Peninsula, occurring along the coast and ascending the large rivers to spawn.
Native name *hilsa*, Bengali.
The fish is cut into slices and packed in earthen jars filled with strong brine, the jar being closed with an earthen plate and round the edges with clay.

278 (254) The roes of the *hilsa* are prepared in a similar manner, and specimens are sent along with the former.
Calcutta Market.

DIVISION XXIX.

OIL.

279 (255) Oil made from the viscera of *Labeo rohita*. All the entrails are removed and boiled in an earthen vessel.

PRODUCTS—SHELL-LIME.

280 (256) A sample of shell-lime.
From Puri.

281 (257) A sample of shell-lime.
From Puri.

SHELLS USED FOR LIME.

282 (258) *Shells.—Unio marginalis, Unio flavidens,* and *Ampularia globosa* are burnt into lime.
From Murshidabad.

DIVISION XXXI.

PEARLS.

283 (260) These pearls are yielded by the following shells, *Unio marginalis,* Lamarck, and *Unio flavidens,* Benson. The shells are found at Bhandardah, *i.e.,* store lake, a bheel near Barhampur.

A bunch of nine strings, each string terminating in a red plush knot, containing about twenty inferior pearls.

Two strings with twenty pearls each.

A string with two large rough so-called pearls separated by a piece of green glass.

Coarse pearls.

From Murshidabad.

DIVISION XXXII.

PLAYING CARDS MADE OF FISH SCALES.

284 (261) *Playing Cards.*—Ninety-six discs made of the scales of the *Mahaseer* fish, *Barbus tor,* and used in the game called *gungifia,* which is played by three persons.

The cards are manufactured at Shahabad, in the Arrah zillah.

DIVISION XXXIII.

APPLIANCES FOR KEEPING FISH ALIVE.

Cages.

285 (262) *Gaije.*—This term seems to be applied to cages of different sizes for keeping fish alive; the following cages for this purpose were sent from Murshidabad under this name:—

The first is cylindrical and measures 6′ 6″ in height, by 3′ 8″ diameter. It is made of split bamboo hooped together, and a little within the opening, which is above, there is a platform occupying one-half of the diameter, the remainder acting as a kind of flap-door which is opened as fish are required. The fish are removed by means of the hand net. The cage is placed into the water up to about 4′.

From Murshidabad. The cage being too large has not been sent.

286 (263) A small basket made of finely split bamboo measuring 8′ × 7″·15 × 5″·50. This is used for keeping fry alive, the basket being suspended by a cord in the water. One corner opens and through it the fry are shaken out.

From Murshidabad.

287 (264) Another 11″ × 10″·50 × 8″.

From Murshidabad.

288 (265) *Ganjia.*—An elongated barrel-shaped cage for keeping fish in the water when caught, a miniature of the large *gaije* of the Murshidabad district, but the upper aperture is of wood. It may be suspended in the water, by two strings, from the side of the boat, and the fish be kept in it as they are caught.

It is called *ganjia* in the Jessor district.

289 (266) *Gaije.*—A cage, 1′ 6″ × 11″ × 8″, the same as the cages called *gaije* at Murshidabad.

It has the same name in the 24-Parganās.

DIVISION XXXIV.

MODELS.

Model of a Bazaar.

290 (267) *Fish bazaar.*—"This model represents," Mr. Ritchie remarks, "the aspect of a fish bazaar in a market place in Bengal. The hour is between 10 and 11 A.M., and the bazaar is in full swing. Sitting all round are the female relatives of the fishermen, who retail the wares. They belong to the fishing castes, *Jāliyā*, *Nikeri*, and *Chandāl*: the fish in the model are all careful *facsimiles* of the originals. One of the women is cutting off the head of a big *ruee* fish, the others are bargaining with customers, who include the saheb's servants, as the khansamah, bearer (in green), and syce (in a blue coat), an old Brahmin, and purchasers of other castes, who have passed on to complete the provision for their midday meal from the vegetable to the fish market. On the outskirts are a Cābuli, who is hawking his stock of warm clothes, a clerk, and the inevitable pariah dog. An idea of the scene will not be complete without imagining a Babel of tongues pitched in every key, and indeed the Eastern fishwife has a flow of language quite equal to that of her Billingsgate sister."

Made by Ram Lal Pal, Krishnagar.

291 (268) Represents a fisherman (caste, *Jāliyā*) casting a net (*kepla*), the most ordinary form of net in use.

Made by Ram Lal Pal, Krishnagar.

292 (269) Represents another man (caste, *Chandāl*) fishing with another kind of net called *bēsali*.

Made by Ram Lal Pal, Krishnagar.

DIVISION LI.

MODELS OF FISH.

By Ram Lal Pal, Krishnager.

Mugilidæ.

293 (270) *Mugil corsula.*

Ophiocephalidæ.

294 (271) *Ophiocephalus striatus.*—The *saul*, Bengali.

One of the most common fish in lower Bengal, and largely eaten by natives.

Labyrinthici.

295 (272) *Anabas scandens.*—The *koi* or climbing fish.

It occurs in great abundance in Bengal, and is largely consumed as food by the lower classes.

Siluridæ.

296 (273) *Wallago attu.*—The *boalli.*

297 (274) *Macrones aor.*—The *aor*, Bengali.

298 (275) *Silundia gangetica.*—The *silond*, Bengali.

Cyprinidæ.

299 (276) *Labeo rohita.*—The *ruee*, Bengali.

300 (277) *Labeo calbasu.*—The *kalbans*, Bengali.

301 (278) *Cirrhina mrigala.*—The *mrigal*, Bengali.

302 (279) *Catla buchanani.*—The *catla,* Bengali.

303 (280) *Barbus chagunio.*—The *sharun pootee.*

Clupeidæ.

304 (281) *Clupea ilisha.*—The *hilsa,* Bengali.

Notopteridæ.

305 (282) *Notopterus kapirat.*—The *chital.*

STUFFED FISH FROM CALCUTTA IMPERIAL MUSEUM.

Polynemus paradiseus.
Caranx.
Mugil.
Wallago attu.
Catla Buchanani.
Cirrhina mrigala.
Labeo rohita.
Notopterus chitala.
Zygæna malleus.

DOLPHIN OF THE GANGES.

306 (*a*) *Platanista gangetica.*—This remarkable form of Cetacean, of which only one species is known, is peculiar to the Ganges, Brahmaputra, and Indus, and is not found in the sea, being essentially fluviatile in its distribution. It ascends the foregoing rivers from their estuaries up to their exits from the Himalayan range, and it is widely distributed throughout them and their larger affluents.

It is not gregarious like many other Cetaceans.

Its food consists of prawns, *Palæmon carcinus,* and of fish such as *Wallago attu* and *Saccobranchus fossilis,* both of which are mud-frequenters.

Its native names are *sus, susu, sunaar, sihoo, hihoo,* and *bulhan.*

Platanisa gangetica is occasionally accidentally caught in the nets of the fishermen.

The flesh and blubber are eaten by some low caste Hindus. The illuminating powers of the oil are said to be high.

A very young specimen in alcohol, from the Hûglī at Calcutta.

REPTILES.

CROCODILIDÆ.

GAVIALIS.

307 *Gavialis gangeticus.*—This Saurian is nearly exclusively a fish-eater, and it occurs in great numbers in the Ganges and its affluents.

It attains to about 20 ft. in length.

Two specimens sent alive from the Hūglī, Calcutta (died during transit).

CROCODILUS.

308 *Crocodilus pulustris.*—This species is widely distributed throughout India. It is not exclusively a fish-eater, but devours all kinds of offal as well. It is especially numerous in Lower Bengal, and during the rains, the young wander about from stream to stream and tank to tank.

It attains to 21 ft. in length.

Two specimens sent alive from the Hūglī, Calcutta (died during transit).

OPHIDIA.

Non-poisonous.

COLUBRIDÆ.

309 A specimen of the common snake, *Tropidonotus guincunciatus*, which, although hardly a fresh-water form, is very aquatic in its habits. It is widely distributed over India, Burma, and Tenasserim.

One specimen in alcohol, from Darbhangah, where it is known as the *dhone*.

HOMALOPSIDÆ.

310 A specimen of a common form of fresh-water serpent, belonging to the family *Homalopsidæ*, which are non-poisonous snakes. The species is known as *Hypsirhina enhydris*, and is prevalent throughout Bengal, Assam, Arakan, Burma, and Tenasserim. Dr. Cantor has given the following account of this snake:—

"Numbers of this species may be seen in rivers as well as in irrigated fields and estuaries, preying upon fishes, which, however, it refuses in a state of captivity. It is of timid and peaceful habits,

A large female, after having been confined upwards of six months in a glass vessel filled with water, brought forth eleven young ones. During the process she lay motionless at the bottom of the vessel; the anterior part of the abdomen was retracted towards the vertebral column, while the muscles of the posterior part were in activity. Shortly after the parturition she expired, under a few spasmodic movements; and also two of the young ones died in the course of about two hours, after having, like the rest, shed the integuments. In length they varied from 6 inches to $6\frac{2}{8}$. The living nine presented a most singular appearance; they remained a little way below the surface of the water, coiling themselves round the body of an adult male which was also kept in the vessel, occasionally lifting their heads above the surface to breathe, at the same time resisting the efforts of the senior to free himself. Fishes and aquatic insects were refused, in consequence of which the young ones expired from inanition in the course of less than two months."

A specimen in alcohol, from Darbhangah, where it is called *machligidhi, i.e., greedy of fish.*

Poisonous.

HYDROPHIDÆ.

311 *Hydrophis.*—An example from the Mergui Archipelago of the poisonous genus *Hydrophis* that abounds along the coasts of India Burma, and the Malayan Peninsula. The individual species are largely represented numerically, and in the Mergui Archipelago, where they are very numerous, as many as twenty specimens belonging to different species are not unfrequently obtained from one fishing net.

They are also very numerous on the coast of Orissa and at the Sandheads.

They live exclusively on fish.

A specimen in alcohol from the Mergui Archipelago.

LIVING TERRAPINS AND TURTLES

SENT ALONG WITH THE EXHIBITS.

EMYDIDÆ.

312 *Cuora amboinensis.*—A specimen from the Nicobar Islands.

313 *Emys thurgi.*—Three specimens from the neighbourhood of Calcutta, where the species is common.

314 *Emys hamiltoni.*—Three specimens from Jessor.

315 *Pangshura tecta.*—One female from Jessor.

316 *Batagur lineatus.*—One specimen from Jessor.

TRIONYCIDÆ.

317 *Emyda granosa.*—One specimen from Jessor.

DIVISION LIII.

BIRDS.

THE SNAKE BIRD.

318 *Plotus melanogaster.*—The Darter, sometimes known as the snake bird, is not at all uncommon in Bengal. It is a large consumer of fish. There are many remarkable points in the anatomy of the bird, but none more interesting than the hair-sieve that occurs at the far end of the stomach, and prevents the passage of bones into the small intestine.

Two specimens sent alive from the Teesta River. One died during transit, the other is deposited in the Zoological Gardens, Regent's Park.

SMALL CORMORANT.

319 *Graculus sinensis.*—This little cormorant is as great a fish-eater as the Darter, which it resembles in its habits.

It is widely distributed over India.

Two specimens sent alive from the Teesta River (died during transit).

ANIMALS DESTRUCTIVE TO FISH.

THE OTTER OF LOWER BENGAL.

320 *Lutra.*—This animal is widely distributed over Lower Bengal, and lives exclusively on fish, has a very voracious appetite, and is

numerically abundant. Large numbers of fish are destroyed by it. When caught young it is very docile, and follows its master like a dog. The fishermen in the Jessor Sundarbans take advantage of this disposition and train the otters to drive fish into their nets, the otter being rewarded with some fish each time it is successful.

These tamed otters have a collar round their necks, and they are secured by it to the prow of the boat, and when their services are required they are slipped like hounds.

Two specimens sent alive from the Jessor Sunderbans (now in the Regent's Park Zoological Gardens).

THE FISHING CAT.

321 *Felis bennetti.*—This cat is very common in Lower Bengal, about Calcutta. It is generally found in low damp situations, and is said to catch fish and eat shell-fish, such as *Ampullaria globosa*, and *Achatina fulica*.

Two specimens sent alive from the neighbourhood of Calcutta (now in Regent's Park Zoological Gardens).

322 Three water-colour sketches illustrating the manner in which the *khepla* is thrown.

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323 Nga-pee, or fish and prawns mixed with salt for export to Upper Burma.

323 (*a*) Nga-pee, as prepared immediately on being landed from the boat.

MADRAS.

THE Collections made in this Presidency were brought together by the exertions of H. S. Thomas, Esq., M.C.S., and Surgeon-Major Bidie, C.T.E., in charge of the Madras Central Museum.

DIVISION XXXIII.

324 Fishing line used by the Laccadive Islanders for catching large fish.

325 Do. Do. small fish.

326 Line made of the Fibre of *Calotropis gigantea*.

327 Lines of different thicknesses made of cotton for deep-sea fishing, and suitable for catching fish of different sizes.

328 Lines, hooks, etc., complete for fishes of different sizes.

329 Line made of cotton, with artificial bait for catching *Polynemus* and *Lates calcarifer*.

330 Line made of cotton for shore fishing.

331 Model of spear, with spear-head attached, used by the Laccadive Islanders for spearing fish.

332 Rod and line, with artificial bait, used by the Laccadive Islanders.

333 Malabar puffing tube, with dart.

334 Crab net.

335 Cup made of cocoanut shell in which the native angler stores his bait.

336 (425) Model of a fisherman's dwelling, Madras.

337 (426) Basket made of the split mid-ribs of the wild date.

338 (427) Sling on which the fish basket is carried.

339 (428) *Thuri Pari.*—A basket made of Palmyra leaves which the Catamaran man takes with him to store up fish when out fishing with nets.

340 (429) *Thundi Pari.*—Basket made of Palmyra leaves which anglers in deep seas carry with them for keeping fish in.

341 (430) *Pari.*—Baskets of Palmyra leaf for carrying fish. These are suspended on one side of the waist.

342 (431) Trays for exposing fish for sale.

DIVISION LII.

I am indebted to W. Blandford, Esq., F.R.S., for kindly rectifying the synonymy of the Amphibia and Reptiles, including the tortoises, turtles, etc., sent from India. F. D.

343 (433) *Emys trijuga,* Madras.

344 (434) *Emyda vittata,* Do.

345-47 (435-437) *Chelonia virgata,* Mangalore, Tuticorin and Madras.

348 (438) *Caduana olivacea.*

DIVISION LIV.

349-50 (442-443) *Delphinus plumbeus,* young and old.

DIVISION XLII.

351 (439) *Lates Calcarifer.*—This specimen is sent to illustrate the following mode of stuffing, which I suggest as calculated to preserve the true shape of a fish so accurately as to enable a naturalist to draw very fair conclusions as to the habits of a fish that he has never seen, and as calculated to be more reliable than the manipulation of even skilful stuffers. The plan is this—a plaister of Paris mould is taken of the fish. Then it is skinned and the skin being placed in the mould, hot glue instead of soap is used as a matrix for arsenical soap, and painted over the interior of the skin, and then the same glue thickened with sawdust is spread all over the interior so as to form a thick wall, and by the aid of plenty of dry sawdust is tightly rammed so as to make the skin fit the mould, from which it not is removed till the glue has cooled and hardened. Then the dry sawdust is shaken out and the skin varnished as usual.

CALCUTTA, 17*th March*, 1883. H. S. THOMAS.

STUFFED SPECIMENS FROM THE MADRAS MUSEUM.

Lates calcarifer.
Serranus flavo-cœruleus.
„ *lanceolatus.*
„ *boenach.*
„ *fuscoguttatus.*
„ *sonnerati.*
„ *malabaricus.*
Grammistes ocellatus.
Lutianus cœruleopunctatus.
„ *marginatus.*
„ *sebœ.*
„ *rivulatus.*
„ *chirtah.*
„ *Madras.*
„ *argentimaculatus.*
„ *Bengalensis.*
„ *lineolatus.*
Therapon jarbua.
Pristipoma furcatum.
Pristipoma hasta.
Synagris japonicus.
„ *toln.*
Gerres abbreviatus.
Chætodon pictus.
Holacanthus zanthurus.
Scatophagus argus.
Ephippus orbis.
Drepane punctata.
Upeneoides?
Chrysophrys berda.
Pterois volitans.
Apistus carinatus.
Teuthis oramin.
„ *vermiculatus.*
„ *Java.*
Polynemus Indicus.
Sciæna diacanthus.
„ *maculatus.*

Otolithus ruber.
Histiophorus gladius.
„ *brevirostris.*
Caranx rottleri.
„ *gymnostethoides.*
„ *affinis.*
„ *armatus.*
„ *sansun.*
„ *gallus.*
„ *speciosus.*
„ *nigripinnis.*
„ *leptolepis.*
Seriolichthys bipinnulatus.
Chorinemus lysan.
„ *moadetta.*
„ *sancti Petri.*
Trachynotus Baillonii.
Equula edentula.
Stromateus sinensis.
Coryphæna hippurus.
Thynnus thunnina.
Cybium kuhlii.
„ *guttatum.*
Elacate nigra.
Sillago sihama.
Platycephalus scaber.
Sphyræna obtusata.
„ *commersonii.*
Mugil cur.
Novacula pavo.
Ophiocephalus punctatus.
„ *striatus.*
Platyglossus bimaculatus.
Etroplus suratensis.
Plagusia marmorata.
Cynoglossus potous.
Wallago attu.
Arius thalassinus.
Saurida tumbil.
Belone melanostigma.
Clupea ilisha.
„ *toli.*
„ *kowal.*
Pellona leschenaultii.
Chatoessus nasus.
Elops saurus.
Megalops indicus.
Chanos salmoneus.
Notopterus kapirat.
Labeo fimbriata.
Cirrhina mrigala.
Barbus Thomassi.
„ *Carnaticus.*
„ *Dobsoni.*
„ *sarana.*
„ *tor.*
„ *Jerdoni.*
Chela argentea.
Anguila bicolor.
Muræsox telabonoides.
„ *telabon.*
Muræna tessellata.
„ *undulata.*
Tetrodon stellatus.
„ *lunaris.*
„ *reticularis.*
Balistes mitis.
„ *stellatus.*
Triacanthus brevirostis.
Stegostoma tigrinum.
Zygæna malleus.
Rhyncobatus djeddensis.
Trygon uarnak.
Myliobatis maculata.
Dicerobatis eroogoodoo.

DIVISION IV.

352-53 (335-336) Models of Laccadive Fishing Boats.

354 (337) Madras Catamaran, full size.

355 (338) Model of Madras Catamaran with Crew.

356 (339) Model Madras Masulah Boat.

357 (340) Fishing Vessel from Tuticorin. Model of a Ceylon boat.

358 (341) Model of Madras Masulah Boat with Crew.

359 (342) Parachal. A coracle or flat-bottomed boat used in rocky torrents in the Bhavani River, Coimbatoor district.

DIVISION V.

360 (343) Coir ropes for Catamarans and Masulah boats.

361-64 (344-347) Fibre of *Crotalaria juncea*, of which nets are made, in its various stages of preparation.

365 (348) Specimen showing the manner in which nets are woven.

366 (349) Implement for twisting thread.

367-68 (350-351) Implements of iron for twisting thread, Madras.

369 (352) Coir rope, of which large nets are made.

370 (353) Machine for twisting coir rope, two strands at a time.

371-73 (354-356) Native rods and lines for catching fish of the Mugil Species.

DIVISION XVII.

374 (357) *Thaugathuvalai.*

375 (358) *Thevvalai.*—This is used in deep and shallow water, and spreads to a distance of about 80 yards. It requires about twenty men to use it who drag it along the water, gradually forming a semi-circle, when the fish thus imprisoned are captured by means of the *Kavathuvalai.*

376 (359) *Kuvathuvalai.*—This net is used for catching large fish in deep water or rapid streams.

377 (360) *Thevvalai* (small).—A net with wooden floats and clay sinkers.

378 (361) *Kalluvalai.*

379 (362) *Uduvalei.*—This is about 40 yards in length, it is tied across the stream in shallow parts of the watercourse.

380 (363) A Sifting Basket.—1½ ft. in length, made of split bamboo, and cocoanut ribs, broad at the top, narrow at the bottom.

381 (364) *Kondavalai.*

382 (365) Malabar dip net.

383 (366) *Pusalavala.*—A drag net with a large mesh.

384 (367) *Vadasila Vala.*

385 (368) *Mapavala.*

386 (369) *Tarucha alevala,* same as *sanapavala,* but with a smaller mesh, from Godavery.

387 (370) *Pedda Chiratavala.*—A drag net with a very small mesh.

388 (371) *Teluvala.*—A drag net with floats, from Godavery district.

389 (372) *Vutchalavala.*

390 (373) A drag net with a small mesh.

391 (374) *Yethuvala.*—A hand net from the Godavery district.

392 (375) *Yelluvala.*—A hand net from the Godavery district.

393 (376) *Phinga jallo* or *Visiru jallo.*—Net for catching small fish, from the Ganjam district.

394 (377) *Muna jhallo.*

395 (378) *Muna jhallo* (small), from the Ganjam district.

396 (379) *Phingia jhallo.*—A casting net, from Ganjam district.

397 (380) *Pellana,* same as *Kaddi jallo,* but with a smaller mesh, from Ganjam district.

398 (381) *Kaddi jallo.*—A drag net, from the Ganjam district.

399 (382) *Kaddi jallo,* with smaller meshes, from the Ganjam district.

400 (383) *Pellana.*—A net like the *Kaddi jallo,* but with a smaller mesh, from the Ganjam district.

401 (384) *Kuttari.*—Trap used in rivers and channels, especially at the time of ebb, when the fish go down along with the water. As soon as they are seen the trap is plunged down all of a sudden vertically with the large mouth downwards, and the fishes are captured by inserting the hand through the small mouth. From Mangalore.

402 (385) *Perkuri.*—This trap is used when large freshes occur in dammed up channels during monsoon, and at spring tides. It is placed obliquely with the large mouth situated at the sluice of the dam, and the small mouth closed with straw, etc., so as to allow no means of escape to the fish. The fish get into the trap by the large mouth, and are unable to find their way out again. From Mangalore.

403 (386) *Kuri*, used like the "*Perkuri*" in small channels. From Mangalore.

404 (387) *Maipukuri.*—Made of the mid-ribs of the leaf of the cocoanut palm. This trap is used like the *Perkuri* for catching fry, generally used by Dhers (Pariahs).

405 (388) *Makkeri.*—This is plunged and held under water with one hand, and the fry are driven into it by the motion of the other hand. It is then lifted up and the water is allowed to run out, leaving the fry behind.

406 (389) *Gude.*—This trap, which is funnel-shaped, is used to catch fish when water falls from a height. When the fall of water is not great the trap is placed erect with the mouth upwards. Should the volume of water be great the "*Yepe,*" which serves as a kind of strainer, is made use of in order to diminish the weight of the water which would otherwise fall with great force into the trap. It is placed slantingly with one end of it resting on the edge of the funnel and the other just beneath the opening of the watercourse. From Mangalore.

407 (390) *Yepe.*

408 (391) *Hurkilu.*

409 (392) *Yerupari.*—This trap is used during floods in channels, being placed across the stream. The fish enter by the large opening and are then shaken out by the smaller.

410 (393) *Yerupari.*—Another of different construction.

411 (394) *Kadambay.*—Trap used for catching fish in time of flood.

412 (395) *Saury.*—A trap made of split bamboo used in catching fish in channels, being placed across stream.

413 (396) *Valangu Pari.*—A trap for catching eels.

414 (397) *Dollika.*—A trap made of split bamboos, used in shallow

water; it is suddenly plunged into the water by the broad end, and the imprisoned fish are caught by hand from the other. From Godavery.

415 (398) *Tigala Mava.*—An oblong, cage-like trap, made of thin split bamboo. It is placed across channels and has openings in the sides so contrived that the fish when once in can never get out again. Only very small fry can be captured in this. From Godavery.

416 (399) *Yesala Mava.*—This is the same as the *Tigala Mava,* but is intended for much smaller fry. From Godavery.

417 (400) *Padda Mava.*—A conical trap placed against rushing water. When the fish are brought down the current they rush into the opening and are thus imprisoned. From Godavery.

418 (401) *Chinna Mava.*—This trap is constructed and used on the same principle as the *Pedda Mava,* but both ends are broad and the opening for releasing the imprisoned fish is on one side. From Godavery.

419 (402) *Vucha.*—This trap is placed across watercourses, and the fish entering by the small openings in the sides are taken out by the openings on the top. From Godavery.

420 (403) *Vadu.*—A small trap made of the stems of a creeper and used like *Dollika.*

421 (404) This is the same as the other *Vadu,* but made of bamboos. From Godavery.

422 (405) *Ilaram.*—A large trap made of thin bamboos. It is placed with the large end against a calingula, and the fish rushing in with the flow of water are caught in it. From Godavery.

423 (406) *Iggilayala Mava.*—A trap like the *Tigala Mava* and *Yesala Mava,* but with the opening at one end and suited for larger fish.

424 (407) *Mava.*

425 (408) *Koramenalu Vucha.* A trap of net-work placed amongst rushes in tanks for murrel (*Ophiocephalus marulius*). From the Godavery district.

426 (409) *Khadano.*—A trap on the same principle as the *Iggilayala Mava,* but having openings at both ends and suited for fishes of all sizes. From Ganjam.

427 (410) *Benda.*—A trap on the same principle as the *Iggilayala Mava,* but having openings at both ends.

428 (411) *Chaduva.*—A trap on the same principle as the *Iggilayala Mava,* but having openings at both ends and suited for fish of various sizes.

429 (412) *Dhoondi.*—A trap on the same principle as the *Tijala Mava* and the *Yersala Mava* and *Vucha,* but suited for different sized fish. From Ganjam.

430 (413) *Bodo guncho goni.*—A trap on the same principle as the *Tijala Mava, Yersala Mava,* and *Vucha.*

431 (414) *Samo guncho goni.*—Ditto.

432 (415) *Pattala goni.*—A trap on the same principle as the *Tijala Mava, Yersala Mava,* and *Vucha,* but suited for different sized fish.

433 (416) *Pulo.*

434 (417) Lines for catching murrel.

435-37 (418-20) *Teuta.*—Four-pronged spears, with barbed heads for spearing fish from boats. From Godavery.

438 (420*a*) *Sinjamavulu.*
(420*b*) *Tipagulu.*
(420*c*) *Tala.*
(420*d*) *Kacha.*—A trap made of split bamboo, used for catching large fish.

439 (421) Catamaran man's cap, made of plaited palm leaf.

440 (422) Basket made of the split leaf stalk of the wild date palm for transporting fish. Carried on the head.

441 (423) Spade made of Palmyra wood, with which the native angler digs for bait worms.

80033

BOMBAY.

THE Bombay Presidency extends from north latitude 13° 55′ to 28° 32′, and from east longitude 66° 43′ to 76° 28′, comprising a total area of 123,860 square miles.

The fisheries of this part of the Indian Empire may be classed as—(1) Marine Fisheries, and (2) Fresh-Water Fisheries, although a more detailed division will have to be hereafter made when dealing with them particularly. The former extend along the seaboard of the Presidency, comprising the southern portion of Sind, the greater part of the Konkan, which contains the Collectorates of Thána, Kolába and Ratnágiri, and the North Kánara District; while the latter embrace the greater portion of Sind, Gujarát, the inland portion of the Konkan abutting on the Ghâts, the Deccan inclusive of Khándesh and Násik, and the Karnátic, by which the remaining districts of Belgaum, Dhárwár, and Kaládgi are meant here.

The fresh-water fisheries, which are conducted in rivers and tanks, have little commercial or economical importance except in Sind, where the Indus and its distributaries and tanks, as also the irrigation canals constructed under the auspices of the present Government, are reported to maintain a class of fishermen in much better circumstances than in any other part of the Presidency. It may be stated here that there is little chance of the fresh-water fisheries of the Presidency rising in value hereafter, as their fish supply appears to be but small and out of all proportion to the requirements of the population living in their vicinity. A great deal has been said on this subject in connection with the indiscriminate capture of fry, and it has even been suggested that these fisheries will rise in importance if worked under certain restrictions, but it is difficult to see how it would be possible to increase their fish supply, when most of the rivers are known to dry up annually during the hot months, and are dependent in a great measure on rainfall for their water supply. It must, therefore, be borne in

mind that the fisheries of Sind and the sea and tidal fisheries alone deserve to be seriously considered in this Presidency.

A laborious inquiry was made by Dr. Day, about the years 1872-73, when that gentleman was employed by the Government of India as Inspector-General of Fisheries, to ascertain whether or not fishermen made any claim to any fisheries in this Presidency; and it was found that, except in the case of tanks owned by private gentlemen or constructed with charitable funds, no subjects claimed any rights of ownership or control beyond, in certain cases, the right of fishing in the vicinity of their homes to the exclusion of strangers. The number of tanks thus erected by private gentlemen and with donations made for charity is not very large, and as the object of their owners and trustees, or managers, is not so much to exact payment for their right of ownership as to prevent fish from being caught in them at all, they may be passed over unnoticed. With respect to the fisheries existing elsewhere Government are admittedly their rightful owners, and this right appears to have been rigidly asserted by them wherever it would prove remunerative. Thus in Sind where, as has been stated above, the fisheries are in a prosperous state, the rate of Batai* paid to Government for fishing is one-third share of the take. (This share is leased out by the collectors of respective districts to farmers.) Again, in the Deccan, where the lakes constructed by the Irrigation Department have some importance in connection with fishing, the right to fish in them is rented. On the whole, however, considering the fact that the greater portion of the fisheries of the Presidency are of little value in an economic point of view, and also the general poverty of the fishing classes, it is creditable to our rule that no payment in the shape of a tax is exacted from a majority of those people for struggling to earn a precarious livelihood.

An examination of the fisheries naturally leads us to inquire who the fishermen are, and this section will be devoted to general observations applicable to the fishing classes of the Presidency as a body. Local peculiarities will be taken up hereafter in the order of the sub-heads of fisheries.

Fishermen evidently belong to the Shudra or servile class, according to the classification of the ancient legislators of this

* The word is explained in Wilson's "Glossary of Indian Terms" to mean division of the crop between the cultivator and the landlord.

country. The Aryan invaders, having found the original inhabitants of the land too far behind them in the culture of knowledge and useful art, denominated them barbarians, set them to menial service, and assigned to them a very low standing in their social scale. The precarious state of their trade and their irregular habits have hitherto prevented the class from regaining their lost position.

The fishermen of the Deccan and the Karnátic came to be looked upon as a separate class, because of their following the occupation of fishing. They, however, consider themselves to be a sub-division of the Maráthás. The fishermen of the Konkan, confined for the most part chiefly to Kolába, which is, according to their own accounts, their principal settlement, are of Marátha origin, and as the fishermen of the Deccan make the same claim, we are probably not far wrong in supposing the two classes to form one sub-division of the Shudra class. The divergence of customs and manners observed between the classes, however, at the present day, is so great that they must be treated of separately.

With regard to Sind the case is somewhat different. That province is, properly speaking, unconnected with the other parts of this Presidency, except as being placed politically under one Government. The fishermen there are described as a Musalmán tribe called Mohanees. It is well known that the province was in former times under the government of Hindu chiefs; and that under the tyrannical rule of the Muhammedan governors entrusted with the management of the province after it was overrun by a body of troops sent by the Kaliph of Bagdad in A.D. 711, the original Hindu inhabitants had to become converts to the Islám faith. Immigration, too, is said to have taken place on a large scale from Arabia to Sind during those unsettled times, and the present population must, therefore, be considered to be a mixture of the descendants of these immigrants as well of the original Hindus.

The fishermen as a class do not appear to have ever been in a condition that may properly be called prosperous. Under native rule they had, it must be owned, greater facilities for salting the fish they might capture in excess of the local demand, on account of the low price of the salt (which was not even then wholly free from duty), but the unsettled state of the country and the scanty means of communication then existing must have naturally rendered the transport of salted fish in any large quantities unsafe. Besides

they had, it would seem, at least on the coast, to pay dues for setting up their stakes. A capitation tax (*Ang dene*) was levied from all Kolis over sixteen years of age, whether they fished or not, and whether they lived in a seaboard village or not. This capitation tax seems to have been in no respect an optional payment required only from those who actually wished to practise fishing, but a compulsory impost exacted from all full-grown men of the common fishing caste, in the belief apparently that if any adult male members of the caste did not engage in sea fisheries, they were rare exceptions to the general rule. It is only under the present rule that peace has been completely restored, whilst the roads that have been made and the railways that have been opened throughout the length and breadth of the land are likely to encourage the growth of the fish-salting trade. Unfortunately the slender means of the fishermen do not allow of their buying salt for that purpose, and as it is always considered by the members of other castes derogatory to their honour to follow an occupation different from the one followed by their forefathers, it does not seem probable that any other capitalists will be induced to lay out their money in this trade. But the whole subject of the incidence of the salt tax and the want of capital is so foreign to our present purpose that we must refrain from discussing it here.

As a necessary consequence of the depression of the trade of salting fish, we find that the fishing castes cannot afford to live exclusively by fishing. Of course, in some parts of the Presidency, the very scanty supply of fish compels men to take to other occupations; but even in the vicinity of the sea, where the supply is abundant, no more fish than is needed for the requirements of the adjoining population can be sold. Some men, therefore, become cultivators, and a few accept service as sailors or labourers.

Fisheries.

The marine fisheries can, by marked distinctions, be classed as—

I.—Coast and tidal fisheries.

II.—Deep-sea fisheries.

The term *deep-sea* in this last division is used in a fisherman's, not in a sailor's sense, as few or no fish are taken out of soundings. It means, therefore, fisheries conducted at some distance from the shore by large boats capable of keeping the sea for two or more

days at a time, or fisheries carried on close in shore by the same appliances as are used in the offing.

The fresh-water fisheries may be conveniently sub-divided as follows:—

(*a*)—The fisheries of the Deccan, including Khándesh and Násik.

(*b*)—The fisheries of the Inland Konkan.

(*c*)—The fisheries of Gujarát.

(*d*)—The fisheries of Inland Sind.

Each of the above sub-divisions will be taken up in order.

Marine Fisheries.

The sea fisheries of the Konkan are, as already indicated, divisible into—(1) coast and tidal or "long shore" fisheries, and (2) deep-sea or offing fisheries.

(1)—*Tidal or Long Shore.*

To understand these it is necessary to describe the coast and estuaries. The Konkan coast runs pretty nearly N. by W. and S. by E. from the 16th to the 20th degree roughly speaking of North Latitude. North of the centre it is fringed by the Bombay Archipelago, called by the early Greek geographers the Heptahesoi, and containing, even at the present day, seven islands, at low water of spring-tides, and at least three times as many at most states of the tide. Many of these latter were islands at low as well as high tide within the English period, but have been united to each other or to the mainland, almost within living memory, by artificial causeways or by the silting up of channels.

The rate of flow of flood and ebb spring-tides up and down the coast is nearly two knots an hour in most places, and there is besides a general northward current during the S.W. monsoon, and a corresponding southward current during the N. E. monsoon, which attain and sometimes exceed the rate of one knot an hour. The Archipelago, of course, has numerous sounds, and the coast is deeply indented by numerous deep fiords or estuaries into which the short but violent local rivers empty themselves; and in these sounds and creeks the tides often reach a velocity of three, sometimes of four, knots an hour. Nay, sailors conversant with the coast say that these figures are probably under the mark. Mean spring-tides rise on this coast from 7 to 17 ft. according to locality. It will be seen at once that any fishery conducted in such waters must be essentially

tidal, and accordingly, during neap tides, the fishermen are mostly ashore idling, making and mending gear or attending to other trades.

The gear used in the coast and tidal fisheries along shore and in the estuaries are in order of importance as follows :—

(*a*)—Stake nets (Dhol: Bhoksa).
(*b*)—Seines (Pera).
(*c*)—Casting nets (Pag).
(*d*)—Shore nets (Golni).
(*e*)—Traps and weirs (Kivs).
(*f*)—Scoop nets (Jila).
(*g*)—Hook and line.
(*h*)—Long line (Khanda), little used.
(*i*)—Spears.

The appearance of the fishing stakes is well known to all persons familiar with the Bombay coast. In every sound and creek the path which fish are most likely to take in passing up with the tide is known, and this is barred by a row of stakes planted from 30 to 80 ft. apart, well below low-water mark.

As the system of stake net-fishing is the chief one that may be said to obtain along this coast, a short account of the way in which the stakes are fixed is subjoined.

The stakes are made sometimes of the trunk of the cocoanut or palmyra-palm, but generally of some sort of junglewood. They average between 40 and 100 ft. in length, and are towed out to sea by two or three boats. The lower end of the stake has a hole in it through which a rope is drawn, and the ends are fastened to boats which anchor off at a distance. The upper end of the stake is then drawn up out of the water in a perpendicular position by other boats, when the stake commences to descend by its weight, and as soon as it reaches the mud the rope at the bottom of the stake is drawn out and two boats are made to hang on by a string which is attached to the top of the stake, and by means of working it from side to side it is sent down some 12 ft. into the mud. A number of stakes are thus put down 25 ft. from each other, and long nets made of hempen twine are tied to them. The fish are driven into the nets by the force of the tide, and are taken out by the Kolis who always remain on the look-out. A stake costs from ten to fifty rupees.

The distance at which these stakes ought to be planted by the fisherman of one village from those belonging to the people of another village is regulated by custom, and is often the source of fruitful litigation amongst the Kolis.

Between these stakes, as the tide begins to rise, are set the nets in the form of truncated cones of any length up to 40 yards, composed of meshes diminishing from 2 inches from knot to knot at the entrance to half an inch at the apex.

They are hauled at the time of the tide, but very seldom set on the ebb. The seine is mostly used on sandy or shallow shores. It is of any length up to 200 yards, but seldom over 8 ft. deep, usually about 6 ft., and has long vertical wooden floats set very close together, and no sinkers. The mesh varies, but is seldom less than half an inch from knot to knot, and seldom much more. It is cast from a canoe, usually from half flood to half ebb tide, the first of ebb being preferred, but is hauled on shore by main force of men. Seines are never hauled into a boat. The dug-out canoes, which are the only row boats of this coast, would not stand it.

The coasting net is exactly similar to that used in Europe. It has cylindrical sinkers of sheet lead or wrought iron. It is much used and with great skill.

The shore net is about 40 ft. long and 10 ft. deep. It is laced to two bamboos and is held by two men in a pass, or they wade up a tideway with it at first of ebb, a little way from the shore. At the proper moment, the outer man wheels shorewards, a third from the shore rushes outwards splashing, and the small fish feeding in the shallow water rush into the net.

Almost every coasting boat has the last two nets, and the crew supplement their diet by what they can catch with them while in port or at anchor on the coast.

The fixed traps are of two sorts. The first are the pounds made on the coast, generally without outlets, the water which completely overflows them at high tide escaping through the interstices of their rough stonework. The others, generally constructed at the head of an estuary, have outlets which are closed at the first of ebb with a bag net or basket.

Certain natural tidal ponds with narrow entrance are worked like the last class. If the water does not all flow off, the remaining area is worked with casting nets and shove nets.

At low water of spring-tides, the lowest reefs and mud banks laid bare are worked mostly by women and boys. They use small shove nets and scoop nets, and, for crabs and crayfish, a peculiar iron hook easily inserted in the crevices of rock.

Lines and hooks are but little used: the best grounds are thought to be the edges of rocky islets and the usual bait is a piece of prawn. This fishing is here of no commercial importance. Long lines with many hooks are known, but hardly ever used.

The boats used in these inshore fisheries are all "Hodis" or dug-out canoes excavated from a single stem of mango or *hedu* (Nauclea) wood. They are sometimes as much as 25 ft. long and 3 ft. in beam, often as small as 8 ft. by one and a half.

The larger often have top-gallant bulwarks of a separate piece of wood and carry a lateen sail. If thought too crank, an outrigger is added. The paddle is a piece of board clumsily shaped like the ace of spades, and tied with cocoanut twine to a bamboo shaft. It does not seem to signify which end of the blade is tied uppermost. They are sometimes used vertically, sometimes pulled like oars, often in a very curious way, the rower sitting very far forward of his rowlock, and pulling, not in the line of course, but at an angle of forty-five degrees to the boat's side. Only one pin is used in pulling, and the paddle is lashed abaft of it with cocoanut twine. Catamarans or canoe crafts made of two or three logs of light wood are also used, but rarely.

No dredges or trawls are known.

The only Molluscs collected are oysters and a univalve like a periwinkle called *kubi*. Of the former there are two species, one resembling the European oyster, and one with a deeply furrowed and toothed shell; the former only is valued. Both the oysters and periwinkles are collected off the rocks at low water and in no other way.

The Crustacea, especially prawns, are very numerous, but mostly get caught along with real fish in the nets, and, except the crab-hook mentioned above, no particular gear is used in their capture. There are no lobsters, although large crayfish are commonly sold by that name in the Bombay markets, and none of the numerous crabs attain the size and quality of those of northern seas. Crab and lobster pots are unknown.

Most of the larger fish appear to prey chiefly on the Crustacea; and in fishing with the hook and the line, prawns are the bait most generally used.

This hook and line fishing is very unimportant. It is mostly confined to the edges of reefs; the lines are but two or three fathoms

long, with a sinker made of the first stone come to hand and two hooks attached above it by snoods of about six inches.

The hooks are European of about No. 9 size, and of the worst quality: the rest of the gear is home-made.

The birds hostile to fish observed near the coast will be noticed under "Deep Sea-Fishing."

(2)—*Deep-Sea or Offing Fisheries.*

Only one class of these is really important, namely, the stake net fishing. The strong currents mentioned before have power far out to sea, and although the charts show few irregularities in the currents or in the nature of the bottom, there appear to be certain courses affected by the shoals of fish and known to the fishermen.

These are crossed by long lines of stakes, to which the great conical nets are moored, usually at the first of flood of spring-tides, and taken up at the turn of the tide. The outermost stakes are set in eight fathoms of water counted at low water of spring-tides about ten knots from shore, and from that shorewards they are to be met with wherever experience has shown that the fish pass, except indeed where the Customs Department interferes in the interests of navigation. They are generally long stems of palm trees roughly pointed at one end and worked down into the muddy bottom by the force of several boats' crews, united for the purpose. When the current is strong they are often stayed to huge wooden anchors. These are composed of two pairs of arms, each somewhat resembling a felloe of a wheel, cut to a chisel edge at the two ends. The two felloes are mortised together at right angles in their centres, and shanked, not with a single timber, but with a sort of conical cage of which the base is secured in the arms and the cable bent to the apex. This cage contains several large stones to give the anchor weight. Being four-armed, such an anchor requires no stock.

The rows of stakes are always at right angles to the general coast line, which coincides with the run of the tides. Between the stakes are moored the huge nets, generally at least fifty yards long and called Dhol, but similar in construction to the lesser stake nets called Bhoksee, already described in connection with the coast fisheries.

The only other nets of any importance used in the offing are the trammels (Jál, Mang, and Waghul), the two former of which closely

resemble in construction those used in the Herring Fisheries of Northern Europe, and fished in the same way. The mesh, however, is generally larger, about one and a quarter inches from knot to knot. The Waghul has a still larger mesh and is moored at each end to an anchor. The coasting net is sometimes used in the offing, but not enough to deserve much notice. Hooks and lines are hardly used at all, and although the long line is sufficiently well-known to have a name (Khanda) it has not been seen in use.

The boats used in the fishery deserve more notice than any other part of the apparatus, differing greatly from any known to Europe and being most admirably adapted for net fishing and smooth waters. They are called Machvás (fishers).

The fishing boats of the Konkan are considered to be amongst the swiftest sailing vessels known.* They are very sharp in the bows, with hollow keel, well rounded in the stern, and the mast slopes a little forward. These vessels are chiefly made of teak.

The hull of the machva resembles the bowl of an old-fashioned egg-spoon, produced at the fine end into a long high and fine prow and below into a deep bottom, the garboard strakes rising very sharply.

The false keel also is deep and of a very curious concave form, unknown, it is believed, in European waters, so that a boat beached only touches the ground with her forefoot and stern post. There is no standing deck, but the whole boat is crossed and strengthened by many strong thwarts and is generally provided with a sort of matting of palm-wood laths fastened with cord, which can be laid down on the thwarts as a temporary deck, or rolled up out of the way, something like patent shutters.

There is generally a low top-gallant bulwark on the port side and on the starboard, where the nets are hauled, a bamboo is lashed to the gunwale for them to run over. Almost amidships is stepped a short heavy mast raking forwards, so that the huge single latine yard is slung between two-thirds and three-fourths of the whole length from the stern.

The yard is about five-fourths of the whole length of the hull and is slung, so that when swinging fore and aft, its butt is just over the very head of the boat and the peak vertically over her stern.

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* An excellent model has been sent to the Fisheries Exhibition.

The sail, however, is sheeted home to a point very little abaft of amidships, leaving the whole stern of the boat clear to work the nets in. It is scarcely possible to conceive a better rig for a fishing boat. The enormous latine yard is easily worked by the strong crew necessary for the trade; room is left for work, and the boat is not lumbered with standing rigging, as there is only one stay which is movable and shifted when the boat goes about. The sail pressure is distributed over the whole length of the boat and the point of greatest pressure is over that of greatest resistance. They cannot, of course, stay, but wear with great speed and grace.

The machva has little gear besides her simple rigging. A grapnel of six arms weighing from 60 to 100 lb., a dozen long paddles, and as many bamboo poles about 15 ft. long, a small heavy box filled with sand to serve as a caboose, two leathern buckets, and a lantern, form the whole of her inventory, and with these on board a boat of twelve tons has probably cost from four to five hundred rupees to build, rig, and fit. They are carvel built, and are now generally iron fastened; but it is not very long since the fastenings were very largely of coir twine, and it is still a good deal used for the purpose, especially in the upper works.

Everything is of the rudest sort. The timber and even the very spars are coarse, and crooked; yet they sail like witches and last longer than their owners.

Such a boat is probably the property of a small capitalist, and from seven to twelve fishermen hire her from him. The produce is divided into eleven shares, of which four go to the boat. The other seven would normally go one to each man, but it may happen (and generally does) that their shares in the nets (which do not belong to the boat) are not equal.

A machva of under twelve tons manned by seven men can fish one "dhol" or long stake net. To fish two she must be of at least twelve tons and manned by twelve men. If she carries trammels, each man of the crew should bring four pieces of net, each two fathoms deep and eighty long. A native fathom is 5 ft. 6 in., so that three men's share would be a mile of nets, and a boat manned by seven men should shoot over two miles; but, as a matter of fact, the equipment of net is never complete. Even canoes with two or three men sometimes cruise many miles out to sea to fish with trammels. That powerful engine the trawl is quite

unknown here, although both the water and the boats are well suited to it.

The lower animals preying upon fish in the estuaries and along the shore are much the same as in the Konkan region, but, of course, the gulls and terns are far more numerous than inland, though by no means so abundant as in the North Atlantic. The grey-backed sea-eagle and osprey are also most common on the coast. The ring-tailed eagle, on the other hand, is rare there, and though the herons fish in salt-water, none of the storks do so, nor is the pelican known to do it. Even the cormorants are not abundant as in inland waters. Of kingfishers, *Alcedo bengalensis* is very common on rocky shores, feeding in pools left by the tide, and *Ceryle rudis* in the creeks. None of the others affect salt-water.

A marine porpoise is very common, and ascends creeks with the tide, doing great damage to nets by tearing fish out of them. The porpoise itself is seldom caught.

No other Cetacean is common, but whales (*Balænoptera*) are not unknown and occasionally get stranded.

Pearl Fishery.—A thin-shelled variety of the pearl oyster exists in the salt-water inlets along the sea coast of Sind and in the Belápur Creek of the Thána Collectorate. The shells are almost circular and translucent, and were once used as a substitute for glass to admit light. The seed pearls now found in them are of very small size, and they seldom realize more than Rs. 10 a tola on an average. The oysters are caught generally by fishermen on mud banks left dry at low tides. Lately, however, the right to dive for pearls has been farmed in the Thána Collectorate. The seed pearls found in Sind are used chiefly as medicines from the supposition that they possess invigorating powers: the larger grains are occasionally made use of as personal ornaments.

The history of the early working of the Sind Pearl Banks is a little interesting. It would appear that immediately on the discovery of the pearl-beds (1837), the exclusive privilege of fishing them was let to a contractor for Rs. 500. In the next year, 1838, the contract was again put up to sale and brought Rs. 975. This offer was soon, however, outbid, and with the want of faith exhibited by the lessors (the Amirs) in their desire to make the most of this fishery, it changed hands successively till the greatest offer amounted to Rs. 1900. The party tendering this sum soon found out that he had

over-estimated the value of the fishery, and, happily for him, he got himself released from his engagement after paying a few instalments. The fishery was then worked by the Amirs on their own account, but it was soon abandoned as the returns fell far short of their expectations.

The British Government on assuming the rule of the province farmed out the right for two years. "The Karáchi Harbour Fishery was let out at the same time (1844) for Rs. 3700, but, owing to a misunderstanding of the terms of the contract, it was resumed and fished by the Collector of the district on account of Government. In one month the sum of Rs. 2278 was realized exclusive of expenses. The fishermen, however, declined to continue the fishery, alleging that they could find no more oysters."

Next year the Collector of Customs at Karáchi made another experiment in fishing these beds on behalf of Government. Several boats and divers were engaged, but after a month's trial it was found that the outlay incurred exceeded the value of the pearls produced.

The harbour of Karáchi was since that period twice let out again. The contractors, however, found it advisable in both instances to suspend operations, as the conviction gained ground that the oysters were too few and scattered to pay the expense of collecting them.

Finally, in his report to Government on the subject, Mr. MacLeod (the Collector of Customs at Karáchi) stated that he was disposed to concur, and to express his belief that the power vested in the contractor in former times of pressing the labour of fishermen and others, and obliging them to work at a nominal rate of wages, constituted the chief value of the pearl fishery.

The fishery was again let in the years 1848, 1849 and 1850. Fishing was then suspended for four years to prevent the beds from being exhausted. At the end of this term it was put up to auction again for two years.

Fishing was again interdicted till the year 1862, when the right was knocked down to one Mr. Coates for Rs. 5000. Subsequently that gentleman purchased the use of the pearl banks for a further period of four years by paying Rs. 10,000 to Government. His profits were considered to be insignificant.

With the view of introducing the pearl oyster on the coasts of the Presidency, the Collectors of all the coast districts were furnished

with papers illustrating and making clear the various plans for the culture of oysters, and requested to select suitable localities for the formation of the oyster banks.

The Government of Ceylon and the Resident in the Persian Gulf were asked to procure supplies of oysters, for distribution to the Collectors, by sinking faggots on the pearl banks, to which the young oysters would attach themselves; or by some other plans described in the treatises on the subject. The oysters were then to be forwarded in casks full of salt-water or by other suitable means.*

Renting these fisheries without any restriction as to the mode of fishing is objectionable, because the contractor is bent upon getting the best he can out of his contract, and it is the lessors, *i.e.*, the Government, who suffer substantially from the exhaustion of the fishing ground.

Fresh-Water Fisheries.

(*a*)—*Fisheries of the Deccan.*

The rivers in this part have no alpine sources, and the waters that flow into them depend, as has been stated above, in a great measure on the rainfall. Most of the rivers flow throughout the rainy season and for weeks or months thereafter, suddenly becoming floods of water while rain is falling, and then rapidly subsiding when it ceases to fall. The rivulets seldom flow to the end of the hot season, though the water that accumulates in the deep pits, existing in their beds, continues down to the commencement of the monsoon. Fishes contrive to live in these pools of water, and it is then only in such isolated places that netting is practised.

With respect to ponds the case is still worse. Few of them have natural reservoirs of water. In fact they exist, so to speak, during the rains, and a few weeks after. Most of these retain very little water during the hot months, and a large part of them dry up entirely.

Æstivation of Fish.—It is with respect to these tanks and their water supply that the extraordinary phenomenon is observed, in the part under notice, of fish and their ova lying in a latent state for months, and of being resuscitated to active life immediately after the first rainfall. As soon as sufficient accumulation of water

* Government Resolution, No. 799, dated 25th February, 1865, Revenue Department.

takes place in the tanks and ponds, which were quite dry for some months previous, they are found to teem with fish ova and fish. One is naturally puzzled to see fishes and their eggs in a place where they were not observed only a few hours before, and is at a loss to comprehend how they could have come there at all. The tanks are mostly situated in densely populated localities, and yet if this phenomenon is to be accounted for by supposing that the fish came into these tanks from without, it is difficult to see how they could have come there totally unobserved. They are found to be covered over with a thick adherent slime. When the water in these tanks becomes low, the fishes congregate together in places where some is still left; and when it ultimately evaporates they bury themselves in the soft mud and remain in a passive state till the return of the monsoon.

The fisheries of the Deccan, inclusive of Khándesh, are conducted in four great rivers, the Tápti, flowing into the Arabian Sea, and the Godávari, Bhima, and Krishna, flowing into the Bay of Bengal; and in their tributaries down to the smallest rivulets. At the very head-waters in the valleys and the glens of the Western Ghâts, rice cultivation exists, and there the fisheries may be said to extend during the rains into the very fields. But the manner in which the cultivation of rice is combined with the capture of fry and small fish belongs rather to the inland Konkan section of this report, as it is far more developed in that province.

Similarly tank fisheries are more especially characteristic of inland Gujarát, where tanks are numerous, and natural lakes not unknown; whereas in the Deccan there is no such thing as a natural lake, and the artificial lakes and ponds called tanks are not so numerous or productive as to influence fisheries much, except a few large reservoirs recently formed or repaired by the Irrigation Department not very far from markets. Some of these, as the Khadakvásla reservoir near Poona, and the Ekruk reservoir near Sholápur, possess already a certain importance as fisheries, and, if scientifically managed, may acquire a great deal more. The main sources of supply, however, are the running waters. These are fished with seine and casting nets in the larger rivers: and in a few places with trammels, with the seine, and here and there with dams in the smaller: and in the streams chiefly with dams and traps. The number of fish caught with the hook is comparatively so small

as to require no notice here; snatching and stroke hauling are unknown, and spearing rare. Poisoning is against law as a common nuisance, and public opinion is said to be strongly against it. It is therefore seldom practised except in a few remote hill streams.

The shove or lave net is not common.

Certain classes of fish are shot with bullets and with arrows, of which the long single-barbed head is loosely set in the shaft and connected with it by a line neatly wound round the latter. This method is chiefly practised by the Bhils of Khándesh and the Northern Deccan.

The amount of fish killed by shooting with either gun or bow is very small in proportion to that of those taken by the hook, and this again is a trifle as compared with the produce of the net.

In number the victims of dams and traps are probably far superior to those of all other methods of destruction put together, but in value they are probably a very poor second to the netted fish, perhaps inferior by fifty per cent., as the trapped fish are mostly small fry or of small species.

Besides their human enemies, the fishes of this region are preyed upon by numerous swimming and wading birds, chiefly Pelecanidæ and Ardeidæ. It is possible that the paddy bird (*Ardeola leucoptera*) and the little cormorant (*Graculus javanicus*) consume more fish by tale in the province now under discussion, than all their other land enemies put together; and if the other species of herons, egrets, and storks, two other cormorants, and the curious snake-bird (*Plotus melanogaster*) which is a "cormorant with a heron's head and neck," be added, the victory would be easy. Of these, however, only the storks and pelican ibises can catch large fish, and these, with the pelican, osprey and fishing owls and eagles, are rare in the area under discussion. The same remark applies to terns and gulls the kingfishers are more numerous but feed largely on insects, especially grasshoppers, except *Ceryle rudis*.

The otter among Mammalia destroys a great number of large fish, in proportion to his size, being very wasteful, but is not very common.

Of Reptiles, certain snakes chiefly *Homalopsidæ* are great enemies of fish, and the broad-headed crocodile and fresh-water turtles eat them whenever they can catch them. As a rule, however, the fish are too clever for the crocodiles and turtles; and the former reptiles live chiefly on the latter, which themselves pick up any carrion or

vegetable rubbish that they can get. The snakes though more active generally find it easier to catch frogs than fish. The frogs themselves undoubtedly destroy much fry and spawn of fish. It need hardly be said that many large fish subsist chiefly on the smaller of their own species, and, indeed, the proportion of piscivorous fish is much greater in the tropics than in Europe, especially the British Isles. All these enemies except the crocodile and the largest fish are much aided by the general shallowness of the waters.

The fish which inhabit the waters described belong for the purposes of this article chiefly to the Siluridæ* and Cyprinidæ†. The odds are about ten to one that a fish obtained at random will be one of these families, and perhaps it is even betting that it will be of the genus Barbus of the former family. The most famous of Indian fresh-water fish, the group of Barbels which share the vague name of Mahseer (of which the type is *Barbus tor*) are abundant in this region, but the best of them confine themselves to deep rocky pools or rapids where they are safe from the net; and it is not every angler who can make fools of them in the clear water of the eight dry months. In the rains the natives are at their fields, the European officers in their stations, and the Mahseer themselves mostly running into the hills to spawn, so they seldom come into the market.

The other Barbels are mostly very poor eating.

Another genus of the Cyprinidæ (*Labeo*), however, frequents opener waters and is very largely netted. Most of the species are fair eating, especially the best known, *Labeo rohita*.

The Siluroids are very abundant, and as they inhabit still and open waters and are very voracious, they are much caught both with nets and hooks. They furnish the commonest fish at European tables in the region, the padi (*Wallago attu*) and the shingála, a name applied to the long-feelered catfishes or siluroids generally, but especially to those of genus Macrones.

It is hardly necessary to say that there are no true salmon or trout in the Deccan, any more than elsewhere in India, and of the Indian fish, sometimes wrongly so-called by sportsmen, the Rajputána trout (*Barilius goha*) is confined to the drainage area of the Ganges, and the Himálayan trout "Oreinus" to the hills which give it name. There is no fish in the Deccan, which any man who had the least notion of what a trout is would ever think of calling by that name.

* Catfishes. † Carps.

True eels are rare, but their place is taken by the spiny eels (*Mastacembli*) called by the natives Bhám, which are very good eating and common on European tables. They take a bait well.

The *Ophiocephalidæ* or murrells are good eating and furnish good sport, and are well-known and widely distributed, owing to their powers of migration over land, from water to water, and even of lying torpid in the mud of dried up tanks.

A similar power of æstivation must be possessed by the Wámbh* (*Notopterus kapirat*) an ugly fish, but a free biter and not bad eating as it is found under similar circumstances.

A number of small fresh-water herrings, some species of *chela*, and the fry of all the large fish, are lumped together under the whimsical English names of Havildárs (*anglice* "Sergeant's guards") and "twelves" derived from a common method of frying them in rows on small skewers.

As the rivers of the Deccan and Khándesh are all shut off from the sea by natural or artificial falls, no marine fish run up to this region to spawn, as salmon do at home and the Indian shad (*Clupœa ilisha*, *Palla hilsa*, or sable fish) does in the lower part of the course of the rivers Indus and Ganges.

Of "fish which be no fish" the Deccan has river crayfish and shrimps, crabs and turtles.

The first, under the name of prawns, are valued by Europeans, and the shrimps are dried and eaten by natives. The crabs, which are very good though small, are only eaten by a few tribes of the latter and a few individuals of the former; and the same is the case with the turtles, which, however, when big enough, make very good soup and curry.

The fisheries are all or nearly all the property of Government, but have generally been left free to the public for many generations except those lately created by the operations of the Irrigation Department, and these are mostly rented by contractors.

In a few pools near temples local religious feeling is strong enough to prevent fishing. In such sanctuaries the fish are often fed by hand and become very tame. Deep and rocky pools furnish natural sanctuaries against anything but poison, and both are undoubtedly most valuable for maintaining the stock of breeding

* Dr. Fairbank does not give it any Maráthi name.

fish which is every year pretty well exhausted in the open waters by their numerous enemies.

Of these Deccan fisheries few are near large markets, and the climate forbids the transport of fish for any great distance. Moreover, none of the more abundant species are worth it for the use of the upper classes. The poorer can afford no fish paid for in cash. Those, however, who have the chance, catch them for themselves in various ways, or exchange grain for them with the more regular fishermen.

There is no likelihood of these fisheries ever becoming much more important than at present.

In the Deccan people who live entirely by fishing are very scarce, except close to the few large markets. These are mostly of the Koli caste, a few are "Bhois" descended from Hindustáni immigrants. The Bhils of Khándesh fish much but never exclusively. Rod fishing amongst natives is chiefly practised by Musalmáns for their amusement rather than for profit.

Proposals have been made for the introduction of fishing laws, but the district officers as a rule have always reported that the game was not worth the candle. The only practical proposal on the subject, that of protecting certain pools as sanctuaries, was embodied in a bill No. 4 of 1880, passed by the Bombay Legislature some time ago "for preserving game and fish," but rejected* by the Viceroy, chiefly it would seem on account of other provisions than those relating to fisheries.

Mr. Wenden, District Engineer, G. I. P. Railway, Poona, who has made the fisheries of the Deccan a subject of special study, appears however to think that protection is desirable. Writing about the necessity of legislating for the protection of fishes, he says—

"Some legislation for the protection of breeding and young fishes would become an immense boon, a perfect God-send to the poorer classes of the population, and eventually a source of great benefit to the fishermen.

"The majority of fishes breed towards the end of the monsoon. Were all netting prohibited from 1st September to 30th November mature breeding fish would not be destroyed, and the fry would increase accordingly, and if, from 1st December to end of March, no

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* "The subject was not of paramount national importance."

nets with a smaller than one inch mesh were used, a large supply of food would be obtained, while the fry would escape and have time to grow until, between March and June, it would yield an infinitely greater weight of food than if it had been destroyed in infancy.

"In early life fish increase in weight with astonishing rapidity.

"I believe that the legislation which I advocate would in the course of three years result in the fish-take being increased from ounces to pounds.

"Amongst the fishermen and the ignorant class of fish consumers such legislation would doubtless engender discontent; but I feel convinced that the supply would increase so largely, and so many poor people would benefit by the results, that after a couple of years the wisdom of Government would be acknowledged and appreciated."

(*b*)—*Fisheries of the Inland Konkan.*

These are confined to the narrow belt of country between the Ghát mountains and the sea, which is cut up by innumerable small rivers. They are great and small raging torrents during the rains, but for eight months of the year consist merely of chains of rocky pools connected at best by shallow and narrow streams and ending in muddy estuaries. Many are crossed by one or more dams, and most of the lower ground in the valleys and glens drained by them is under rice cultivation, flooded during the rains with surface-water from the hill-sides. The rice fields form a regular network of little ponds through which every drop of water that falls above them must pass on its way to the rivers.

The fish of this region are for a fisherman's purposes much the same as those of the Deccan, from which it is only separated by the water-shed of the Ghâts, and the upper part of which closely resembles it in physical character. In speaking of those highlands some reference was made to the capture of spawning fish and fry in the rains by means of traps and weirs; but this method is far more largely practised in the Konkan.

Every stream is covered with weirs, called "kivs," in the outlet of which is either a net or a trap constructed of basket-work. Kiv, then, is the permanent stonework of a fishing weir. Its usual shape is that of a truncated cone, the apex down the stream, with a gap in the apex for fixing the basket-trap. The broad end of the funnel of the trap is, of course, up stream; the hole at the other end is

stopped with a bunch of grass. The larger traps are called Malai, and they are set, as stated above, in the opening of the weir (kiv). The lesser are called Tokya and Bagli, and are set in the waste weirs of rice fields. The kivs are frequently of considerable size and strength, and are considered by the people to be hereditary and transferable property, but are in no way noticed by Government. Besides them, every rice field has its little basket-work trap in the outfall, and almost every fish which leaves the main river to spawn must, when it returns, run the gauntlet of a number of obstructions of this sort, as the fry also must do later in the season. It is a wonder that any escape; and it is believed that the stock is chiefly kept up by fish spawning in the more rugged and desolate parts of the province. The tank fisheries here are few and unimportant. Some of the tanks and pools are protected, as in the Deccan, by local custom; some of the former are so weedy and some of the latter so rocky that they cannot be fished, but the stock is undoubtedly small and poor in most places.

Besides the traps, the seine and casting net are used by professional Koli fishermen, not numerous on the fresh-waters: the hook and bullet by Musalmáns or Europeans for amusement, and the arrow occasionally by the forest tribes. The latter are also accused of poisoning rocky pools that cannot otherwise be fished, but the practice is not believed to be at all common. The fisheries under review are naturally dwarfed by the neighbourhood of the more important coast fisheries, and very little notice is taken of them as the fishing season is during the rains, when the European officers keep mostly under cover. Their produce is but little sold. It becomes a supplement to the diet of the labouring classes who mostly carry on these fisheries. No one is known to derive his livelihood solely from these Konkan fresh-water fisheries.

It is doubtful whether anything can be done to revive them. Certainly the abolition or restriction of the trap system would favour the spawning of fish and improve the fish supply. As regards such traps as are situated in Government waste lands, this could be carried out under the present law, but not without producing much hardship and discontent.

The animal enemies of the fish are the same as in the Deccan. The crocodile is very rare; the water-snakes and bull-frogs very common.

(c)—*Fisheries of Gujarát.*

The fisheries of Gujarát differ in some very important respects from those of the Deccan and the Inland Konkan. The country is, for the most part, an enormous plain. It is crossed by short sections of two very large rivers, the Tápti and Narbada, and contains almost the whole length of the Mahi and Sábarmati, which, though inferior in size to the last-mentioned, are yet important streams. All have a continuous, though not very abundant, flow, even in the hot weather. In the rains they roll wide and deep from the hills to the sea. The lower part of each is bounded by high and steep banks enclosing sandy beds out of all proportion to the usual volume of water. The Tápti and Narbada receive in this province no tributaries of importance; but the Mahi has several affluents, and the Sábarmati half-a-dozen.

There are besides innumerable tanks, many of them large and perennial; and the Ahmedabad District has one natural lake (the Nal of Viramgám), which contains at least twenty-four square miles of open water and as much more of weedy marsh. In the Paránti j Táluka of the same district is a series of smaller lakes lying in a hollow called the Bokh and covering altogether perhaps three hundred acres of ground; and further east, partly in the same táluka and partly in native territory, is another group of small lakes, reckoned by local tradition as three hundred and sixty in number. The fishes of this region are much the same as those of the two last, but the Mahseer group of Barbels is poorly represented for want of the rapids, which they affect; the genus Labeo, on the other hand, is here rich both in variety and number; and there is one new species, the Anadromous Indian shad (*Clupea ilisha*), called throughout the Bombay Presidency "Palla." This fish is kept out of the great rivers of the Deccan by natural and artificial obstructions; and it appears to despise the short and shallow Konkan streams, though often caught in the sea off their mouths. But it does enter the Tápti, and perhaps the Narbada and Mahi, though in no great numbers. It does not ascend the Sábarmati.

The fishes of Gujarát have great advantages over those of the last two provinces. The rivers do not contain many natural refuges, but in the weedy depths of many of the perennial tanks and lakes they are safe from man, and, to a great extent, from all other

enemies. But what is more important still, a vast number of tanks, probably at least half of them, are more or less protected by the influence of the powerful and numerous Gujaráti sects, whose tenets forbid the destruction of animal life. Many of these tanks are never fished at all.

During the rainy season half the country is often under water, and the fish from the protected tanks escape and wander, seldom stopped by any trap or weir, to less crowded waters.

The consequence is that the country is, on the whole, rather under than over-fished; and in almost every pool or tank the water seems to boil with fish in the evening.

All fishing birds are numerous; the species mentioned as common in the Deccan and Konkan are seen here in far greater number, and those which are only occasionally seen there, as the pelicans, storks and terns, are here common. The osprey and ring-tailed fishing-eagle are seen every day, and the kingfishers are on every few square yards of water.

The crocodile, uncommon in the Deccan, and all but unknown in the Konkan, is here in every tank, but seldom reaches any very great size, and the ugly reptiles are so well-fed in the water that they seldom meddle with land animals. Otters are plentiful in the marshes which border the Nal and the Parántij lakes, and are seldom shot or trapped. All these, however, are, to a great extent, powerless against fish in deep or weedy waters.

The chief means of capture in Gujarát are the same as those of the Deccan, the casting net being that most used, and after it the seine. The hook and bullet are here, as elsewhere, used chiefly by sporting Musalmáns or Europeans, and the arrow by the forest tribes. Poisoning, as in other provinces, is probably practised in the small streams of the remote forests. Traps and weirs are very uncommon. The spear is occasionally used on the Parántij lakes.

On some of these, during the hot weather, the water, as the natives say, "gets hot," that is some change takes place at the bottom, and either the mud gets stirred up or some gas is evolved from it which stupifies the fish. They float gasping about the surface and eventually many die. The fishes which die in this manner must be those which Dr. Day has called "water breathers."*

* "Fresh-water Fish and Fisheries," p. 24.

They respire oxygen obtained from air in solution in the water and which is separated at the gills, and when the water in which they reside becomes changed from clear to muddy, their gills become choked, respiration ceases, and death ensues.

The following is an account of a phenomenon of this sort which Mr. W. F. Sinclair, C.S., First Assistant Collector, Kolába, witnessed at Parántij, in April, 1881 :—

"Only one corner of the Little Bokh, a lake of sixty acres, was affected. The shore there was marshy and weedy, and the bottom a deep mud, receiving during the rains some drainage from the town, but at the time referred to none at all. The lake having both an infall and outfall has a sluggish current, and at some distance below the 'hot water' was received a little sullage from the dyeing and washing of cloth, but at that point the fish were plentiful and healthy. In the 'hot water' they came up by thousands to the surface and were speared, clubbed and shot with arrows as they floated about. Those so killed when eaten were of good flavour and perfectly wholesome; but the fish which died in the water were refused even by the castes to whom land carrion is lawful and delicious. The bottom-feeding siluriods were perhaps the most affected, but the barbels, the small *Percidæ*, and even so active and clean a fish as *Cirrhina mrigala*, died in almost equal numbers. This continued for several days, at the end of which the fish ceased to die, and in two more the affected part of the lake had been colonized from the rest of it and was apparently as full of fish as ever. No poison had been introduced from without, nor had the waters been in any way disturbed nor were any bubbles to be observed on the surface."

It will be concluded from what has been mentioned of the fisheries of this Province that no protection is here required for fishes. Indeed, if any is really wanted, it is for the fisherman who sometimes gets hard measure from sects whose perverse benevolence holds the life of a man much cheaper than that of the lower animals.

Not only are private waters protected (and in Gujarát many tanks are private property), but the right of the public to fish in open waters is obstructed by all manner of direct and indirect means, and a valuable source of food supply is not made half use of.

(*d*)—*Fisheries of Inland Sind.*

The fisheries of Sind are the most satisfactory and healthy in the Presidency. It has been said that in the Deccan all the circumstances are against fresh-water fisheries, even to the scarcity of water; that in the Konkan the same evils are exaggerated by the reckless destruction of fry and the fisheries overshadowed by their marine neighbours; and that in Gujarát, where there is plenty of water and abundance of fish, their utility is compromised by stupid bigotry.

In Sind the case is quite different. The Indus, one of the greatest rivers of the old world, is at once, if one may so speak, the spine and main artery of the Province. Its overflow covers the low lands with waters and feeds many perennial and still more temporary lakes and channels (Kolabs and Dhands), besides the perennial and seasonal canals, all of which are full of fish.

The people are very free from religious prejudice on the score of food; every village is a market, and the largest towns are all on the Indus or near it.

The riverain proprietors, that is to say, the Government, the State of Khairpur, and the Jághirdárs of Sind, derive a considerable income from the fisheries, which besides maintain a large fishing population in a rude but not miserable condition, and even support a certain number of capitalists. In a word, the fresh-water fisheries of Sind alone, of those in this Presidency, employ capital and labour and pay rent on an equal footing with the cultivation of the soil.

The most noticeable fish of Sind is the Indian shad or palla (*Clupea ilisha*), the sable fish of Madras and hilsa fish of Bengal. From weights taken the average weight of the palla is set at four and a half pounds, and the extreme maximum at ten; but fish over seven pounds weight are uncommon. Immature fish, of course, do not ascend the rivers to spawn. The palla begin to run when the river rises in April and May, and are perhaps most numerous in July and August. They are always scarce in September, and are rarely caught in October. Contrary to what has been observed in the great Madras rivers, which have a much greater incline than the Indus, they prefer in that river to ascend in the heaviest floods, and at such times even choose the surface-water, which, of course, has a

much higher speed than the bottom water. In the heaviest flood ever known, at the Sukkur defiles of the Indus in 1882, they could be seen from the shore passing up stream in hundreds all day.

Ordinarily, however, they swim low in the slower bottom water, and this habit is taken advantage of to ensnare them in a very ingenious fashion. The palla net is a sort of gigantic landing net, with a triangular mouth, a deep purse, and a shaft 20 ft. long. The fisherman floats down stream, either seated in the bow of a small flat punt, built for the purpose, and thence called a "palla-dhundi," or supported by gourds strapped to his back or balanced on a huge neckless earthen jar called a "palla-chatty" (constructed *ad hoc*). He holds the shaft of his net vertically, and as he travels with the speed of the surface-water, the resistance of the slower bottom water causes the net to bag up stream. The shad, pushing up with the vehement instinct of all breeding fish, runs up into the net and signals his own arrival by a slight jerk. Before he has time to think of turning about, the upward lift of the net has left him at the bottom of an ascending pouch, a sharp twist of the shaft closes him in beyond the chance of escape, and the fisherman, slowly shortening his hold, extracts his captive, finishes him with a knife to prevent his struggling, and consigns him to the bottom of the boat or pot; or, if his own support be a gourd, passes a huge needle through his eyes or gills and shoves him down to join a string of previous victims towing beside the float.

In some favourable spots, especially where the river is stone-faced and the inshore water deep, as in the Sukkur pass, the fisherman walks down stream along the shore, taking care to preserve the proper pace with reference to the bottom current, that is, to walk faster than it, so that the net shall bag up-stream to allow the shad to enter.

The heavy pots, which are considered the most killing craft of "palla" fishing, are used where the cast or reach within which the fish are to be got is short. The gourds are most used where the cast is long (sometimes several miles), and the fisherman does not care to have half-a-day's walk back along the bank with his net-pot and take on his head. Both are preferred in the neighbourhood of large markets, where the fish can be sold fresh to the "palla-dhundi" or "shadpunt."

But there are great lengths of the Indus, far from any large

town, where the market for fresh fish is small. The palla, like other *Clupeidæ*, stands keeping very ill, and in such places the fishermen of Sind form camps, sometimes of as many as two hundred huts, and the fishery is conducted entirely in punts. The method of capture is the same in all cases, but the puntmen come ashore once in the day with their take, which is split and salted or more usually dried.

A palla-dhundi is a sort of small Noah's ark. In the bow is a little deck where the fishing is done. The bulk of the boat is undecked in the ordinary sense, but has a rude awning of grass matting, strong enough to serve as a spardeck, on which the crew sleep at night. By day under this lives the Mohanees,* one or two able-bodied men, their wives, children, a couple of goats, a dog or two, and perhaps a cat. On outriggers are perched from one to seven or eight tame pelicans, which they do not use for fishing, but keep, as we do geese, feeding them on the coarser fish, and very often a couple of herons, snared to be sold for hawking to the Amirs of Sind, who are great falconers, as the Mohanees themselves are skilful fowlers.

All the fisheries are sold annually to contractors, who receive from the Mohanees the state's or Jághirdár's share of one-third of the fish. Practically they must agree with the Mohanees of that section, or the latter strike, and the contractor loses on his farm as he cannot afford to watch many miles of river and prosecute them in the courts for illegal fishing. *Per contra*, he cheats them as much as he can in the "tourny shop" business and in accounts, and many of them are in his books for sums which it would ruin them to be sued for.

On the whole they are not badly matched and get on well enough together, their quarrels being all in the way of trade and neither can do without the other. The contractor usually buys the fisherman's share of shad, as well as taking his own, and disposes of the whole.

The coarser fish taken in the Indus, where the Palla is a fish, just as the salmon alone is a fish on a Scotch river, are mostly consumed on the boats. A few may be sold retail in riverside villages by the Mohanee women, who are decidedly the "better horses," and do what they please in all matters with a freedom rare in Musalmán communities and scandalous to all the other faithful in Sind. Afloat

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* The local name of the fisherman.

they are as handy in the boats as their husbands, though they are never seen actually fishing nor the men selling fish.

The Dhundis when not drifting down stream are usually poled along in the dead water near the shore, though they have all clumsy oars or paddles and some very primitive sails.

The Mohanecs are localized and know their own boundaries very well. A certain number of fish are caught in the Indus with the hook, but as already mentioned a palla only is a fish in the main river and the number of other fish caught in it is of no importance commercially, except perhaps close to such markets as Sukkur or Hyderabad. In the canals, as a rule, net fishing is discouraged on account of the damage done by trampling down the sandy banks into the channel.

There are, however, exceptions as at the head of the Eastern Nára Canal, where there is a regulating bridge forming an obstruction. On the lower side of this are hung nets in frames into which fish pushing up stream leap. These are chiefly Dumbro (*Labeo rohita*), the most important fish in Sind after the shad. It should be remembered that in Sind the Indus has no tributaries, only distributaries, as it flows on a channel raised by its own silt above the general level of the province, which it is only kept from overflowing by vast systems of embankments. The Po furnishes an European example of the same thing.

The shad, therefore, pushing always up stream, do not in Sind leave the main river, and the same instinct that leads them up, leads the Dumbro up the canals towards it. The Dumbro being much more tenacious of life than Clupeidæ, are kept alive for many hours by the cruel expedient of passing an iron needle and strong line through their eyes and mooring them to a stake. A string of six or seven dozen may often be seen so moored at the Nára Bridge Fishery. They do not struggle at all and seem to suffer little, and are so kept till it is convenient to send them to market. As they keep, even when dead, much better than the shad, they form the staple supply of markets at some distance from the Indus, such as the city of Shikárpur. They have also the advantage of being in season all the year round.

The other fish are almost all caught in the Dhands and Kolabs, *i.e.*, hollows filled by the inundation of the Indus.

The chief are the padio (*Wallago attu*), khago (*a rita*), singhala

(several species of macrones), murrells (*Ophiocephali*), and Notopterus kapirat.

The Barbels are not so common, and the Mahseer group inhabiting chiefly rapids are only found in the hill streams of the border such as the Bolan river, where they are of little commercial importance, but afforded good sport to some of our officers during the last Afghan campaign. Besides the Palla net, the seine, casting net, and spear, are the favourite fishing tools in Sind. Walls and traps of wattle work are also used in the Dhands and Kolabs, and the hook and line to some extent on all waters.

Small fry are taken in all sorts of ways, but owing to the abundance of large fish and the comparative plenty of meat are not sought after there as in other parts of the Presidency. The fresh-water Crustacea are rare and of no importance, and the Musalmán religion which prevails in Sind forbids the use of turtles which abound in the Indus and grow to three feet long over the shell and more.

The enemies of fish other than man are more numerous there than even in Gujarát. Besides the osprey and ring-tailed sea-eagle (*Haliætus fulviventer*), the grey-backed sea-eagle (*Haliætus leucogaster*) is common. Pelicans, cormorants, terns, the curious skimmer rhynchops, which has been proved by Ball to be piscivorous, and the various herons, are numerous throughout the year, and the storks in winter.

Of Mammalia the Otter is more common than in any other part of the Presidency, and the Bullan or Indus porpoise (*Platanestra gangetica*) is confined to the Indus and is our only fresh-water Cetacean. The common crocodile is not so common as in Gujarát, but by no means rare, and the long-nosed fishing crocodile (*Gavialis*) is found in Sind alone in this Presidency.

But there is no indication of diminution in the supply (except where old Dhands and Kolabs are now cut off from the Indus by the great protective embankments raised of late years), and the fish attain a greater average size than in any other of our provinces.

The fact is that the number of fish which can be destroyed in the main stream of the Indus by any means now employed by man or by any number of the lower animals, is out of proportion to the vast stock contained in it, and this stock will not be seriously diminished unless a great increase of population leads to the extensive use of

fixed engines on the river. The nature of the river would render the maintenance and management of these difficult and costly in most places, and at present there does not appear to be any likelihood of their introduction.

It was at first intended to embody in this report some statistical information regarding the fishing castes, and with that view a circular was addressed to the various district officers in the Presidency. In spite of the irksome nature of the work most of these gentlemen have very obligingly collected all the information obtainable, but the sub-divisions of castes returned are so many and so peculiar to each district that any analysis of them consisting of statistical work would prove dry and uninteresting. Besides, the information received did not tally with that given in the occupation return published along with the last census report, apparently because a number of people styled themselves fishermen (though they have no existing interest in the fishing trade) merely because they belong to that caste. Castes in India are well-known to have been co-extensive with occupation in their origin, but now that the number of fishers has outgrown the want felt for them, it is but natural that some of the caste should betake themselves to other occupations. The caste system institution of this country is so rigid that it does not permit a man to change his caste with his occupation.

After careful scrutiny of the last census returns the Superintendent, Mr. Baines, has published a table exhibiting the numbers of those engaged in the fishing trade in the Bombay Presidency.

The following are the principal sub-divisions of the fishing castes of this Presidency, with the names of the provinces to which they belong:—

Sub-divisions: 1. Mohanees, in the province of Sind; 2. Máchi, Gujarát; 3. Khárvi, Gujarát; 4. Gabit, Konkan; 5. Mángela, Konkan; 6. Koli, Konkan; 7. Bhoi, Deccan; 8. Dhimar, Deccan; 9. Kahár, Deccan; 10. Harikantra, Karnátic. 11. Ambi, Kánara; 12. Moger, Kánara, these two being indigenous and confined to the Kanara District alone.

Some more information could have been obtained in the census office; but at the time the present enquiry was commenced that office had been abolished, and the officer who had been entrusted with its superintendence had returned to his substantive appointment.

Several references have been made to Mr. Baines, and he has with great kindness supplied such information as was within his reach, and offered some useful suggestions; but the bulk of the records which it was necessary to consult to extract the needed information were locked up in Poona unarranged, and could not be tabulated and arranged without the employment of additional clerical agency.

In this Presidency there are no fishmongers properly so-called; both the fishermen and women, principally the latter, being engaged in the sale of fish.

Some of the lower castes, such as the Mahárs of the Deccan, the Dublis, Várlis, and Káthodis of the Konkan, and the Bedars of the Karnátic, are too poor to pay for the fish they require for home consumption, and therefore they procure there own supply.

The educational status of the fishing castes is very low. Very few amongst them send their children to school, and most of the few children thus sent are taken away from school as soon as they are considered able to be useful at home.

The Máchis and Khárvis of Gujarát appear to be a little in advance of the other fishing castes in point of instruction. Some children of the Gabits of the Konkan are shown in the census report as under instruction, but the general ratio is very low.

Female education has not yet taken hold even amongst the higher classes in India, and therefore it would be too much to expect anything in that direction amongst the fishing castes, since their women are called upon to continually assist the male portion of the population in their employment.

The Kolis, fishermen of the Konkan, are a hardy race of short stature, somewhat inclined to corpulency. Their arms are more muscular than their legs owing to the nature of their occupation. The men amongst them vary in colour from dark to ruddy brown. The women have a fairer complexion, but when they grow up, as they work out of doors in the sun, generally throughout the day, they soon become nearly as dark and tanned as the men. Some of the younger women, however, look fair and handsome. As the Kolis and their women are essentially a seafaring race to a greater or less degree, and as they have to undergo a good deal of physical exercise in carrying on their occupation, they appear superior in health and constitution to the other classes inhabiting the sea-coast district.

The men amongst them wear a cap of red broadcloth over their heads, and cast a striped Malabár handkerchief loosely across one their shoulders. Lately they are observed to wear waistcoats of some rough wollen cloth. They do not wear Dhotirs like other Hindus, but pass a loincloth between the legs. This is also a Malabár striped handkerchief. When they appear in the courts or revenue offices they wrap a bordered Dhotir around their waist, stretching down a little above the knee. They have always a small clasp-knife hanging from the neck. They wear the top-knot and moustache, and get themselves shaved once a fortnight.

The women wear a loose long-sleeved bodice covering their elbows, and a robe wound tightly round the waist, and not falling more than half way to the knee. The end of the robe is drawn over the right shoulder and tucked in front into the waistband. They wear glass bangles only on the left wrist, those on the right arm being taken off and thrown into the sea on the wedding day to win its favour. They twist the hair into a close knot and tie it with a black silk cord.

On high occasions some of the men wear a silk-bordered waist-cloth and a white cotton coat, and others merely put on a white cotton coat in addition to their everyday clothing. The women at festive times dress with great care and neatness, wearing a profusion of flowers. They have a roll of false hair added on to the usual knot of hair which hangs in a bunch at the back of the head.

The Kolis are somewhat ill-tempered, quarrelsome, and jealous of strangers. Being addicted to drinking from their infancy, they do not lack occasions to put their copious vocabulary of ill-names into use. They are, however, manly, brave, honest, and faithful, even to a fault. The majority of them are known to run into debt on account of their extravagant habits. Some have, however, purchased land and become cultivators.

The Kolis are to be met with along the sea-coast from the fort of Arnála, near Bassein, to Jaygad in the Ratnágiri district. They have a Patel at their head in every village wherever they have settled themselves, and Alibág appears, according to their traditions, to be their chief settlement. The Patel there is styled Sir-Patel, and his commands in social matters have considerable weight amongst them. The Alibág Kolis were very notorious for their depredatory and piratical habits in former times, and in the warfare of the Maráthas

with the Newábs of Janjira they used to serve as soldiers, fortguards, and sailors in ships-of-war. The Sir-Patel is the chief of all Kolis from Kalvan and Bhiwndi in the Thána district to Harnai in Ratnágiri. One of their ancestors had charge of the fleet of the Alibág chief, and their right to the headship of the caste is said to have been recognized even by the Emperor of Delhi. Under grants made to them the family, it is said, could put members of their caste even to death if they behaved improperly or broke caste rules. At the present day they have only one deed in their possession granted by Ibráhim Adil Sháh II, of Bijápur, in 1606. It merely exempts certain Patels therein named from forced labour.

The Kolis cannot account for the origin of their race, and as there are no traditions extant amongst them to show that they are immigrants from some other province, it is not unfair to conclude that they are the aborigines of this part of the country who have taken to fishing from time immemorial, and have on that account been looked upon as a separate class. Social disputes amongst them (and sometimes light offences against person and property) are taken cognizance of, and decided by a meeting of the old and respectable members of the caste, under the presidency of the headman or Patel. The parties generally offer to be guided by the verbal decisions pronounced by these arbitrators. It is customary in some places to require a payment of a fee of one rupee and four annas from the complainant before the Panchâit assembles. If a plaintiff succeeds he gets his costs from the other side, who is in addition made to pay a fine of from Rs. 5 to Rs. 50, according to the degree of his offence to the caste. Sums so received are generally spent on matters of charity, such as the erection and repairing of temples, though they are sometimes used to defray the expenses of caste entertainments. In default of the payment of the fine and the costs awarded against him, the offender is excommunicated from the caste. This ultimate sentence is technically known amongst them as exclusion from or shutting up of fire and tobacco, meaning that the community refuse to take fire or tobacco from the delinquent.

The men amongst them marry from the tenth to the fortieth year of their age. The marriageable age of girls is from eight to twenty, and sometimes to thirty. Unlike other Hindus, the marriage of a woman with a husband younger than herself is permitted amongst these people. Infant and widow marriages are allowed.

The parents of the bridegroom, or in their default some other paternal relations of the proposed suitor, open negotiations with the parents of the bride, and offer a sum of money not exceeding Rs. 100 or Rs. 150, according to their means. Half of this sum is generally spent on the ornaments with which the girl is decorated. At Thána and other places the father of the bride presents his son-in-law with a dress of Rs. 5 or more.

On the fifth or sixth night after the birth of a child the customary worship of the goddess of fate is held by the family. It is supposed that on this night the goddess delineates the future of the child on his forehead.

The dead bodies are either burnt or buried, according to the means of the children of the deceased, or in their default of his surviving near relations. The near relatives of the deceased sit in mourning for from three to twelve days according to the custom prevailing in their locality.

No birth-day anniversaries are kept amongst this class, nor do they observe any ceremonies like other Hindus on the anniversaries of the deaths of their relations. They are known, however, to hold a feast in honour of the dead on the last day of the Bhádrapada month, corresponding with the English month of September.

The right of the headmen to some perquisites is universally claimed by them, though in some localities it has dwindled to a mere form. In Alibág a fee of one rupee is still paid to the Sir-Patel at every marriage, and he gets a handful from every boat load of fish that comes ashore. This money payment does not seem to prevail in other places, the right there being limited to a portion of the fish caught and to formal honour being paid on occasions of marriage. The latter consists of some leaves of Chivaca siriboa and betelnut being offered to the headmen before the other guests.

The chief holidays of the Kolis are the Gauripuja and the Nárali Paurnima, though, as being Hindus, they observe the other Hindu holidays in a slight degree. Both of these occur during the rainy season, when, as they are not very much engaged, they can afford to abstain from all sort of work. Like other people of all nations, they put on their holiday clothing on these days, and use better food. Every one of them, however, drinks some liquor on these days, and very few can resist the temptation of getting tipsy. The first, that is the Gauripuja, is, properly speaking, a festival of their women. It

is commemmorated in honour of the goddess of wealth by the higher classes, and the Koli women go dancing in groups before houses of their wealthy townsmen on the night of the holiday. The small presents which they receive as a reward for their dancing are spent in buying liquor.

The second, *i.e.*, the Nárali Paurnima, is the men's holiday. The stormy part of the monsoon is considered to be at an end by this day, and the Koli offers a cocoanut to the sea to win its favour, as he has soon to trust himself to its mercy. As a rule they do not venture out to sea before this day from the commencement of the monsoon, any deviations therefrom being rare. Most of the vessels which have taken shelter in the creek from the commencement of the rains are put to sea immediately after this day, and the fishermen have consequently again to leave their homes very soon afterwards. The day is considered to be one of special rejoicings, and the Kolis therefore spend it in drinking and eating. The coming of both these holidays is watched with considerable interest, and business is vigorously resumed after their occurrence. The Gauripuja occurs in September, while the Nárali Paurnima falls about three weeks earlier, generally in August.

The Kolis speak low Maráthi. Their words are mostly provincial, and foreigners who have studied pure Maráthi, as obtaining on the Poona side, find it a little difficult at first to understand them.

When a Koli builds a new boat or machva, he gives a dinner to his friends and relations on the occasion of its being first launched. The fermented juice of the palm-tree is freely drunk by the guests invited on such occasions. The women, too, honour new boats with reverence and break cocoanuts upon the boat's bows, pretty much as champagne bottles are broken at home on like occasions. When a cargo of fish arrives, it is first of all sorted on the sea beach, and the best fish carried by the women in their baskets to the nearest market for sale. When the market town is at a distance the men join them in carrying the supply. The varieties of fish which are not used as food are allowed to remain there to dry, being afterwards sold as manure. In the sea-coast districts some fresh fish are also used as manure.

Each ship generally carries a boy as one of her crew. He is occasionally a relative of the Tindal. His employment consists of preparing the usual meals and that of filling up the tobacco pipe,

though he is sometimes required to assist the crew in baling out the water and in rowing.

The ordinary machvás are not provided with any compass or other instruments, as they never venture very far to sea out of their ordinary beats.

The ship is rented at so much a season by the Tindal when he is not her owner, and when he has not his own relations serving under him as sailors, etc., he engages the services of as many men as are considered necessary to man the vessel. The usual mode of remunerating these servants is by allowing them a share in the produce of each trip, exclusive of rations, the Tindal getting a double share, and one share being set apart on account of the hire of the vessel. The freight charges received are distributed according to these shares at the end of each trip. Primarily the Tindal is responsible to his men for their wages. But it occasionally happens that the vessel is employed by contract for the whole season, and in that case the sailors and the Tindal receive money on account from the owner of goods as necessity arises, the balance being paid off at the end of the season.

The Tindal is responsible for discipline on board the vessel, where his orders are obeyed by the rest of the seamen. As a rule, he enters into arrangements with merchants for freights of cargoes, but as the Khalásis depend in a great measure on freight for their remuneration, they also do all they can to procure it.

The Khalásis have to watch by turns during the night when on board the ship. The crew mess together on board the ship, eating out of a wooden platter. They eat rice, rice bread, and fish. They are very partial to drink, and the fermented juice of the palm-tree (toddy) was, until very lately, used by them in very great quantities. They were, therefore, set down as the greatest drunkards amongst the Hindus. The recent heavy taxation on the tapping of these trees has considerably enhanced the price of the juice, and consequently the Kolis find it difficult to indulge their drinking appetite to its full extent. They cannot, however, do without drinking some every day, and as they are now called upon to pay twice or three times what they once paid for a seer for one-fourth of the quantity or less, they grumble very much at being deprived of what they looked on as something which could lighten their labours and banish their cares and sorrows.

In their worship of God the Hindu fishermen appear to be imitating their brethren of the higher classes. They make pilgrimages to Násik, Phandharpur, Jejuri, Dehu, and other Hindu shrines in the Deccan with great zeal, and they appear at Thána to have raised two or three men of their own class to the rank of Sádhus (saintly beings) by making them Sanyásis. A temple has been erected by the fishermen there which is consecrated to the Hindu Trinity (the God Dattatráya), and some provision has also been made for the support of the Sádhus (who are the constituted worshippers of the God) in the shape of subscription and alms. Annual processions are held at stated periods, and, in a word, the whole bespeaks an ardent desire to imitate the ways of worship practised, or, more correctly speaking, enjoined to be practised, by the higher castes.

They appear to be very hospitable, and treat their relations who come down to them on business according to their means. They even accompany their guests on their business, thus manifesting in every possible way their desire of being serviceable to their guests. The latter, on the other hand, unless they happen to be very closely related to their hosts, are extremely eager to curtail their visit, and seldom stay longer than is absolutely necessary, so as to prevent the inconvenience to their entertainers resulting from suspending their work on the sea.

The joint family system obtains amongst this people. As the men and women are both somewhat ill-tempered and quarrelsome, brothers generally separate on the death of their parents.

The native Christian fishermen of the Thána district are the members of the Roman Catholic Church. It is said that they were compelled to abjure their old creed, and to embrace the Christian religion, under the rule of the Portuguese during their occupation of the North Konkan. Spiritually they are subject to the jurisdiction of the Archbishop of Goa, who nominates their priests. They are not greatly in advance of their Hindu brethren in point of civilization, and therefore it sometimes happens that they are swayed by the religious prejudices of the latter to join them in worshipping their titular deities and to sacrifice to them. All such offences against the rules of the Church receive condign punishment when brought to the notice of the priests, and the greatest secrecy

is accordingly used by those concerned in the performance of heathen ceremonies.

The Kolis pay considerable reverence to Bráhmans, one of these being their family priest. They set a high value on his opinion in social matters, and consult him on all occasions of difficulty. His services are called into requisition, chiefly in connection with births, marriages, and deaths. He has to name the children, and this is usually done by calling them after the name of the day of the week on which they happen to be born. The marriage matches, too, are settled with his concurrence or under his sanction. It not unfrequently happens that marriages contemplated by the parents of a boy and girl are given up by these ignorant people solely in deference to the advice imparted by the family priest, who is accessible to intrigue when bribed by some interested party. The fees with which the fishermen remunerate their priests are, when compared with their means, extremely liberal.

The nets and ropes used by these people in connection with their fishing operations are all manufactured at home. The men, when not actually engaged at sea, generally employ their spare time in spinning and twisting the requisite thread. This is formed from the fibre of cotton or hemp. When the latter is used it is dipped in some chunam mixed with water, and allowed to boil for a period of about twelve hours to increase its durability. The fibre is spun into a fine thread around a wooden axis or pivot, which serves for a hook. The thread is then woven round a circular piece of cane or bamboo, and then the necessary meshes are formed. The size of the mesh varies from one thirty-second part of an inch upwards, between knot and knot, according to the kind of fish for which it is intended. Nets have small pieces of wood and balls of lead tied along one border, which serve as weights when they are cast into the water. The ropes are made of the yarn of Malabár coir, which is bought by them in large quantities. It is particularly preferred on account of its durability and economic value.

The fishermen grow great quantities of hemp (san), *Crotalaria juncea*, and prepare it themselves for use in fishing gear; and for fixing stake nets they largely use withies of a wild vine, but for rigging and ground tackle they use coir rope brought from Bombay.

They use the barks of *Terminalia glabra*, *Canavalia virosa*, and of the different species of acacia for dying their nets.

The fishermen of Sind are a Musalmán tribe called Mohanees; they are sub-divided into four classes, namely Karácha, Lana, Bundri, and Wungara.

Like their brethren on the Bombay side, they do not live exclusively by fishing, but engage in unskilled labour.

The traditional account of the origin of their race given by these people is that Dáud, a Muhammedan prophet, finding his disciples in want of food and employment, permitted them to fish, which was first commenced in the town of Arlitah in Arabia, and that they are immigrants from Arabia. We have already stated that the present population is a mixture of the descendants of the original immigrants as well as of the early Hindu converts; therefore the above account must be accepted as showing how fishing came to be permitted to Muhammedans in general, rather than the origin of the present fishing castes of Sind.

In Kolabs and Dhands fishing is carried on all the year round, but in the River Indus the season lasts from the beginning of March to the beginning of September, when the palla fish come up from the sea to deposit their spawn.

The fishermen profess to be the followers of the Suni sect of the Muhammedan religion. One of their branches (called Jhabar) is looked upon with contempt and considered outcast by the rest, simply because they are in the habit of eating the porpoise and crocodile, which are considered unclean by the rest of their brethren. Consequently the Jhabars are not allowed to eat or intermarry with the other sects of the community.

The males of this class usually marry at the age of twenty and the females at fourteen. Though there is no caste distinction in the Sindis, who are all Muhammedans, they always marry with those of their own trade only.

On the occasion of a birth, jágri (coarse sugar) is distributed among the relations of the family, and on the sixth day of the birth four arrows are fixed in the ground, one on each side of the mother, seven small pieces of cotton thread being tied round each arrow. In the case of boys the ceremony of circumcision is performed on the seventh, tenth, or twentieth day after birth.

The burial ceremonies observed by this class do not differ from those of the other Muhammedans. The dead body is washed, and then dressed in clean clothes and taken in a litter to the churchyard,

where it is buried. The Korán or some verses from it are read, and prayers offered for the salvation of the soul of the deceased. A lamp is kept burning at the spot where the deceased expired for three and sometimes for seven successive nights. Mourning is observed for three days. On the fourth day the family give an entertainment according to their means.

The fishermen in Sind observe the general holidays of the Suni class.

The language spoken by fishermen in Sind is Sindi and sometimes Panjábi. The Sindi dialect is said to be a mixture of Sanskrit and Arabic.

The fishermen in Sind, under the rule of the Amirs, were subjected to a number of taxes both complicated and heavy. These were rendered more burdensome by its being left to contractors to exact payment in money or in kind according to their pleasure. Besides the greater portion of the fish caught, they had to pay head money on the crews of vessels leaving for Bombay, Muskat, and other places, and in some instances they were called upon to pay a tax for each passenger on board the ship. The consequence was that, up to a very late period, the fishermen were more or less involved in pecuniary difficulties.

The fishermen of the Deccan and Gujarát have so far identified themselves with the other lower castes of the province they dwell in, that it is difficult to draw a line between their manners and customs and those of the other castes. This is in a great measure to be attributed to the want of proper occupation, as they are necessarily called upon here to mingle with the other castes much more than in the Konkan, and therefore their mode of living in the parts under notice evidently derives its tone from that of their neighbours.

Some of the fishermen in the Deccan appear to be the descendants of those who came and settled there about the time of the Emperor Aurangzeb from Bundelkhand in Northern India. They marry amongst themselves, and speak a dialect of Hindustán considered by them to prevail in the province from which their forefathers emigrated.

In accounting for the origin of their race, the fishermen of the Deccan state that they were specially created to punish the "fishes" by killing them for having insulted the wife of Shiva, the destroyer

of the universe according to Hindu mythology. The goddess, it would seem, took offence at the conduct of a sage who went to the tank she was bathing in to take water, and cursed him. A fish who was an eye-witness of this scene, and who is said to have overheard the curse pronounced by the goddess, made some strictures on her conduct in pronouncing an imprecation on a sage, and pointed out to her that she went uncovered in her early youth. She became extremely enraged at this fresh insult on the part of the fish, and it is stated that she besought her lord to create fishermen to destroy fish.

Fishing is carried on all the year round in both the provinces, though the number of fish captured during the rains and a few months after is much greater than the take during the summer in some of the districts.

The Koli fishermen of Gujarát appear to have headmen of their caste in some places. They are nominated by the whole community and their appointment is not hereditary. They are consulted in the settlement of caste disputes. They are not paid for their services.

In Gujarát the eleventh day of each half of the Hindu lunar months is considered a holiday, when the fishermen abstain from fishing and spend the day in repairing and dyeing their nets.

The fishermen of the Deccan observe all the ordinary holidays of Hindus. The nets used by them are prepared at home.

When no means of capture are at hand the Bhils of Khándesh have a peculiar way of catching fish in the pools of their district. They form a line across the pool, and, steadily advancing, beating the water and uttering loud cries, drive the fish before them till, finding themselves in the shallow water, they leap up, fall on the shore, and are easily caught.

The fishermen and women in the Deccan dress in the same way as the other Marátha castes. The men wear pagris made up according to the Marátha fashion with corners at the sides, dhotirs, a waistcoat without sleeves, and shoes. The women wear long robes (lugadis) and short bodices.

They speak Maráthi much in the same way as other inferior cognate castes do.

The marriageable age of a boy amongst them is from the twelfth year upward, while that of a girl is from the eighth year. Widow marriage is permitted.

On the fifth and sixth nights after delivery the goddess of Fate is worshipped. Her influence over the child and its mother for the first twelve days is considered to be supreme, and therefore a goat is sometimes sacrificed to her on the fifth or sixth day. On such an occasion the father of the child invites his relations to sup with him. The child is usually named on the twelfth day, when female relations who are in the actual married state are asked to a dinner; towards evening the child is put into a cradle and named according to the wishes of its parents.

As a natural consequence of the child-marriage system, the contract of a marriage takes place between the parents of the bride and bridegroom, unless when the latter has attained his majority and has no relatives to act on his behalf. A pagri (head-dress), a coat, a pair of dhotirs, and a pair of shoes are presented to the bridegroom on the occasion of his marriage by his father-in-law. The girl is decorated with ornaments according to the means of the parents of the bridegroom.

With regard to burial ceremonies, the dead bodies are either buried or burnt. Immediately on the death of a person his body is washed and placed on a bamboo bier and covered with a piece of cloth. The body is then removed to the place where it is intended to be burnt or buried by four members of the caste on their shoulders. It is then buried or burnt according to the means of the deceased. The surviving members of the family of the deceased are considered to be in a state of impurity for ten days. A dinner is given on the thirteenth day to friends and relatives.

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Victoria and Albert Museum, Bombay.

DIVISION I.

(1)—MODEL OF FISHING STAKES AND NETS.

CLASS I.—SECTION 1, DIVISION 1.

442 (444) Net used for catching larger description of fish. From Aden.

443 (445) Do. smaller sorts. Do.

444 (446) Do. smaller sorts with smaller meshes. Do.

445 (447) *Chogia* cast net. From Gujarát. A circular net used by a single fisherman standing on the beach. There are leaden weights round the circumference, which as the net is flung flat on the surface of the water draw it down, and which being drawn together by the retaining cord as they sink cause the net to assume a globular form from which there is no outlet.

446 (448) *Yedi* or *yeri* net. From the Konkan. A long shove net three times as long as the short one.

447 (449) Deep-sea fishing net made of hemp. From Kárwár.

448 (450) *Jál* net. From the Konkan. A deep-sea trammel exactly resembling the English herring trammel, but of larger mesh and with long wooden floats instead of corks.

449 (451) Deep-sea fishing net made of *Oomli*, with floats of mangrove. From Kárwár.

450 (452) *Vagur* net. From the Konkan. A sort of very large trammel, set in the sea to two anchors as the English herring trammels.

451 (453) *Karal pag* net. A casting net, from the Konkan.

452 (454) *Pera* net. Seines. Do.

453 (455) *Dhol* net. From the Konkan. The great stake net used in the offing.

454 (456) Harbour net made of hemp with mangrove floats. From Kárwár.

455 (457) Casting net made of hemp with leads. Do.

456 (458) *Khandála* net with clay sinkers and woodon floats. From the Konkan. A small net of very light thread made like a seine, and used by the wandering tribes inland in shallow water.

457 (459) *"Akhu"* net. From the Konkan. A scoop net fixed to a handle for small fish.

458 (460) Fishing spear. From the Konkan.

459 (460*a*) Do. hook. Do.

460 (461) Do. another size. Do.
Do. a third size. Do.

461 (462) Long line with large hook. • Aden. Used in catching sharks.

462 (463) *Waga* cord. From Gujarát; about 200 spans long with smaller cords hooked and baited at span distances along it. It is drawn through water behind a boat.

463 (464) Hand line with hook. From Aden.

464 (464*a*) Do. another size. From the Konkan.

465 (465) Do. a third size. Do.

466 (466) Malai basket trap. Do. It is set in the permanent stone-work of a fishing weir, whose usual shape is that of a truncated cone, the apex down stream, and a gap in the apex.

468 *Tokya* basket trap. The *malai* is set in this gap.

469 *Bokshi Bagli* do. Do.

470 *Mudhya* basket trap. The *malai* is set in this gap.

471 *Kolati* do. Do.

472 Cord used in hauling nets. From Aden.

473 Trap basket used for fishing in Aden waters.
Gholwa net. The short shove net.
"*Asu.*" A handled scoop net for catching mud fishes. From Mándád, Rájpuri Creek, Colába district.

474 Basket used in carrying fish. From Aden.

475 A peculiar hook used in catching crabs.

476 Do. another sort.

DIVISION IV.

MODELS.

477 A fishing canoe.

477 (*a*) Do. boat, machva.

477 (*b*) A small fish canoe with paddles. From Aden.

478 A *Batel.* Do.

479 A *Zaroogah* or *Bagarah.* Do.

DIVISION VIII.

480 Oomli in stage of preparation.

481 Hemp do.

482 Hemp fibre.

483 Oomli creeper.
Sample of the Malabár coir-rope. Used by the fishermen of Konkan.

DIVISION XXI.

484 (493) Red broadcloth cap used by a fisherman. Bombay and Thána fishermen usually wear such caps.

485 (494) Do. another shape. Bassein fishermen usually wear these caps.

486 (496) Malabár handkerchief. Worn by men.

487 (497) Two knives. Hung up with a thread round the neck.

488 (498) A *lugda* or sári. Worn by women.

489 (498*a*) A *khan*—piece of cloth of which bodices are made. Do.

490 (499) Ear-rings. Worn by men and women.

491 (500) *Kardoda*. Worn as an ornament by men around their waists.

492 Bangles, glass. Worn by women.

493 (501) Do. metal. Do.

MODELS.

494 (485) A fisherman as observed in the Deccan.
A fisherwoman do.

495 (487) A fisherman of the Konkan.

496 (486) A fisherwoman do.

497 A fisherman of the Konkan (Bombay Koli caste).
A fisherwoman do.

498 (484) A model illustrative of the spinning operations. Two women are spinning the fibre and one man is collecting the spun stuff round a bobbin.

A model illustrative of the dyeing operations. The nets are steeped in the decoction made for that purpose in an old and broken canoe. Two men are carrying the dyed nets and two are spreading them in the sun.

DIVISION LVII.

PHOTOGRAPHS.

499 A general view of the spinning and dyeing operations of fishermen.

Details of the spinning operations.

Do. dyeing operations.

A scene near the seashore.

A group of fishermen and women.

DIVISION XVII.

500 Four basket traps.

501 *Petta.*—Gourd floats in net, used by fishermen in deep water to float them waist high above the surface.

502 *Kirkinda.*—The typical fish basket. The net and floats are carried over the other end of the bamboo.

503 *Zilli.*—A kind of shrimping net.

504 *Choba.*—A "plunge" net—a bag net fixed to an iron or bamboo ring, from which rise three bamboo rods, which are fastened together

at or near the tail of the net. Wading in the shallows the fisherman plunges the net to the bottom, then with his hands passed through the hole at the tail of it, captures any fish that are imprisoned.

505 *Cherri.*—Fishing rods. Sind.

506 *Lamb-dorya.*—Night or dead lines. If a large fish is taken it is allowed to make away with line and gourd into a place where the fisherman can net him.

507 *Bhuse.*—These nets, constructed of very fine cord and of a large mesh, vary in length, and are often 500 ft. long and 2 ft. broad, stretched across a still pool they are left in some hours, usually the whole night, when fish attempting to pass it are entangled. It is weighted to float slightly below the surface.

508 A net fastened to a triangular frame of bamboo, used in much the same way as the European shrimping net.—*Jhile* or *Pelui.*

509 *Kudallay.*—A net stretched across still pool, it floats immediately below the surface, and entangles all fish that attempt to pass it.

510 *Lavkari* can only be described as a *bag-drag net.* It is often 70 to 80 ft. long, with its square mouth 30 ft. across and 10 ft. high. It requires as many as fifty men to work it. Is used only in deep still waters, and costs as much as three hundred rupees.

511 *Tiwari.*—A net with very large meshes. Stretched across a pool, it is weighted to float near or at the bottom.

512 *Pandi.*—Drag nets, 6 to 8 ft. deep, and varying in length, mesh, and texture; floats above and weights below, where there is a bag or pocket.

513 *Surki.*—A heavy casting net of strong cord and large mesh, for the capture of fish in heavy running water. A cord passed through the meshes at the outer diameter enables it to be closed, and captured fish are confined, as it were, in a bag. The outer diameter is drawn to land first.

514 *Bhore* or *Pagir.*—A light casting net.

515 *Khavari.*—A small bag net. They vary in size, and are often 50 ft. long, with the mouth 15 ft. broad and 5 ft. high. They are fixed in strong currents, generally artificially caused by the formation of rough stone dams with openings (in which the net is fixed) therein.

516 *Ganjwa.*—Net in which captured fish are confined when fishermen are wading or floating. It is worn round the waist.

DIVISION XXI.

HINDU MYTHOLOGY.

517 (488) A model representing the Fish Incarnation of Vishnu (Protector of the Universe).

518 (489) A model representing the Turtle Incarnation of Vishnu (Protector of the Universe). Hindu legend relates that the Gods, on being discomfited by the Fiends (*Daitya*), fled to Vishnu, who advised them to make a temporary peace with the *Daitya*, and with their aid to churn the ocean, using Mount Mandara as a churning rod, the serpent Vasuki as a thong, and the turtle Vishnu as a prop. By this immortality was secured, along with fourteen other precious gifts to man.

DIVISION LX.

519 Day's Fishes of India, in 2 volumes.

Do. Reports on the Sea Fish and Fisheries of India and British Burma.

Dr. Fairbank's pamphlet on the Deccan Fishes.

Annual Statement of the trade and navigation of the Bombay Presidency for the year 1872-73.

Do., 1873-74.

Do., 1876-77, in 2 volumes.

Do., 1877-78, do.

Do., 1878-79, do.

Annual Statement of the trade and navigation of the Bombay Presidency for the year 1879-80.

Do., 1880-81.

Annual Statement of the trade and navigation of the province of Sind for the year 1872-73.

Do., 1873-74.

Do., 1874-75.

Do., 1876-77.

Do., 1878-79, in 2 volumes.

Do., 1879-80.

Do., 1880-81.

Do., 1881-82.

DIVISION XXVI.

FISH, DRIED OR SALTED.

520 *Umbrina dussumieri. Maráthi name,* Dátarya Dhoma. Dried and used as food.

Sciæna sina. Do., Gomare Dhoma. Do.

Trichiurus savala. Do., Toki Vákati. Do.

„ *muticus. Do.,* Vákati. Do.

Stromateus cinereus. Do., Saranga. Salted and used as food.

Boleophthalmus boddaerti. Do., Khavala Nivta. Dried do.

Sphyræna acutipinnis. Do., Joban Tol. Do.

Bregmaceros atripinnis. Do., Tengali. Do.

Harpodon nehereus. Do., Bombil. Do.

Coilia dussumieri. Do., Mándeli. Do.

Clupea lile. Do., Motaka. Do.

Pellona brachysoma. Do., Bhing Pálu. Salted do.

Sepia officinalis. Do., Makali. Dried do.

Palemon serratus (the Prawn). *Do.,* Sode. Do.

Crangon vulgaris (Shrimps). *Do.,* Sukat (Kolambi). Do.

„ *Do.,* Kád. Do.

Roes (3 samples). *Do.,* Bhot. Do. Used as food by the Bohorás.

Shark fins. Used as food by the Chinese.

DIVISION XXVII.

Oil (Fish), 2 samples. Applied on boat bottoms.

DIVISION XLVI.

521. Class *Cephalopoda*—
Nautilus pompilus.
Class *Gasteropoda.*
Strombusauris diana.
„ *carnarium.*
„ *gracilis.*
„ „ (white var).
„ *Sp.*
Pteroceras rugosa.
Rostellaria curta.
Murex anguliferus.
„ *ramosus.*
„ *ternispina.*
„ „ (young).
Ranella spinosa.
Triton chlorostoma.
Turbinella rapa.
Pyrulla paradisiaca.
„ *papyracea.*
„ *Sp.*
Ficula lævigata.
Eburna valentiana.
Purpura persica.
„ *bufo.*
Cassis pila.
„ *undata.*
„ *glauca.*
Dolium chinense.
„ *maculatum.*
Dolium Sp.
Harpa nobilis.
„ *ventricosa.*
Oliva modesta.
„ *nobilis.*
Conus textile.
„ *arenatus.*
„ *lignarius.*
„ *Sp.*
Cyprœa caurica.
„ *tigris.*
„ „ (young).
„ *talpa.*
„ *mauritiana.*
„ *annulus.*
„ *arabica.*
„ *pantherina.*
„ *lynx.*
Natica lamarckiana.
Turritella duplicata.
Solarium perspectivum.
Trochus niloticus.
Bulla ampulla.
Helix ceraria.
„ *detecta.*
„ *falicosa.*
„ *bistrialis.*
„ *tranchibarica.*
Pecten crassicostatus.

Avicula margaritifera.
Arca granosa.
Tridacna squamosa.
Circe pectivata.
Cytherea impudica.
„ *Sp.*
Solen siliqua.
Pholas dactylus.
Bithynia pulchella.
Janthina africana.
Pleurodoma nodifera.
Pearls. Found in the creeks of the Thána Collectorate.
A string of coral beads. Worn as an ornament by Goanese Christian women.

DIVISION XLIII.

522 *Porifera sponge.* From Aden.

DIVISION XLVII.

523 *Asterias rubens* (Sea Stars). Two specimens.

DIVISION XLVIII.

524 Worms used for bait. In spirits.

DIVISION XLIX.

525 *Bopyrus crangorum.* In spirits.

DIVISION L.

526 *Squilla mantis. Maráthi name,* Ichár. In spirits and stuffed.

DIVISION XLVI.

527 *Sepia officinalis* (Officinal Cuttle-fish). *Maráthi name,* Mákli. In spirits and stuffed.
Sepiola vulgaris (The Common Sepiola). *Do.,* Sarmákol. Do.
Callianassa subterranea. *Do.,* The Mother of the Sea. Do.
Palemon serratus (The Prawn). *Do.,* Kolambi. Do.
Crangon vulgaris (The Common Shrimp). *Do.,* Do. Do.
Gelasimus annulipes. *Do.,* Khekada mutha. Do.
Cardisoma cornifex. *Do.,* Do. Do.
Thenus orientalis. Stuffed.
Fish ova. In spirits.
Lupea pelagica. *Do.,* Chimbhori. Stuffed.
,, *cribraria.* *Do.,* Khekadi. Do.
,, *sp.* (with three red spots). *Do.,* Do. (with three eyes). Do.
Platyonichus bipustulatus. *Do.,* Khekadi. Do.
Palinurus vulgaris. *Do.,* Shevadi. Do.

DIVISION LI.

528 *Lates calcarifer.* *Maráthi name,* Jitáda. Stuffed.
Serranus areolatus. *Do.,* Hekru. Do.; one in spirits. *Arabi name,* Samana.
,, *fasciatus.* *Do.,* Teda. Stuffed.
,, *diacanthus.* *Do.,* Teda. Do.
,, *Malabaricus.* *Do.,* Hekru. Do.
,, *Gilberti.* *Do.,* Do. Do.
,, *grammicus.* *Do.,* Do. Do.
,, *Coromandelicus.* *Do.,* Do. Do.
Lutianus argentimaculatus. *Do.,* Támb. Do.
,, *bengalensis.* *Do.,* Karkutla Támb. In spirit. *Arabi name,* Kashabár.
,, *chirtah.* *Do.,* Támb. Stuffed.
,, *quinquelinearis.* *Do.,* Mungav. Stuffed.

Lutianus johnii. Stuffed.
„ *marginatus.* Do.
Priacanthus blochii. Do.
Apogon endekatœnia. Maráthi name, Bakor. Do.
Dules argenteus. Stuffed.
Therapon jarbua. Maráthi name, Náyada. In spirits. *Arabi name,* Jurira.
„ *theraps. Do.,* Náyada. Stuffed; also in spirits. *Arabi name,* Zuriva.
„ *puta.* From Aden.
Pristipoma commersonii. Stuffed.
„ *furcatum. Maráthi name,* Náyada. Do. *Arabi name,* Baruma.
„ *maculatum. Do.,* Karkutla. Do.
„ *hasta. Do.,* Do. In spirits. *Arabi name,* Nakma.
„ *operculare. Do.,* Do. Do. *Do.,* Do.
Diagramma crassispinum. Stuffed.
„ *pictum.* Do.
„ *punctatum. Maráthi name,* Hotya. Do.
Labotes surinamensis. Stuffed.
Scolopsis phœops. Do.
Synagris tolu. Maráthi name, Kadakela. Do.
Gerres poeti. Do., Mungav. In spirits.
Chœtodon vagabundus. Do., Chánd. Stuffed.
Holocanthus nicobariensis. Stuffed.
Scatophagus argus. Maráthi name, Vádá. Do.; also in spirits.
Ephippus orbis. Do., Kharvad. Do.
Drepane punctata. Do., Chándava. Do.; also in spirits.
Psettus argenteus. In spirit.
Upeneoides tragula. Maráthi name, Chiri. Do.
Upeneus macronemus. Do., Do. Stuffed; also in spirits. *Arabi name,* Khorfi.
Lethrinus karwa. Stuffed.
„ ? *Maráthi name,* Palu. Do., Kuradisa.
Chrysophrys datnia. Do., Karkutla. Stuffed; also in spirits. *Arabi name,* Maramus.
„ *berda. Do.,* Kharvad. In spirits.
„ *sarba.* Stuffed.
Scorpœna haploductylus. Do.
Pterois volitans. Maráthi name, Kombada. Do.

Minous monodactylus. *Maráthi name,* Dhoma. In spirits.
Teuthis stellata. Stuffed.
„ *oramin.* *Maráthi nama,* Dhagavir. In spirits. *Arabi name,* Tafeza.
Holocentrum cornutum. *Do.,* Chirya. Stuffed.
Polynemus sextarius. *Do.,* Ravás. Do.
„ *tetradactylus.* *Do.,* Rávas Chelách. Do.
Otolithus argenteus. *Do.,* Dátarya Dhomá. Do. also in spirits.
Sciæna sina. *Do.,* Gul. Gomer, Kadakada. Do.
„ *semiluctuosa.* Stuffed.
„ *belengeri.* *Do.,* Dhoma. In spirits.
Histiophorus gladius. *Do.,* Tádmása. Stuffed.
Trichiurus savala. *Do.,* Toki vákati. In spirits
Acanthurus matoides. In spirits.
Caranx rottleri. *Do.,* Karakara bángada. Stuffed; also in spirits
„ *kalla.* *Do.,* Bángada. Do.
„ *affinis.* *Do.,* Do. Stuffed.
„ *gymnostethoides.* Do.
„ *armatus.* *Maráthi name,* Katati kávala. In spirits.
„ *kurra.* *Do.,* Tedi and Moti bángada. Do.
Neucrates ductor. Stuffed.
Chorinemus toloo. *Maráthi name,* Falai. Do.
„ *sancti Petri.* *Do.,* Do. Do.
Trachynotus ovatus. *Do.,* Katáttitaka. Do.; also in spirits.
Platax teira. *Do.,* Kavala. Do.
Equula fasciata. *Do.,* Katáti. Do.
„ *ruconius.* *Do.,* Titaka. In spirits.
„ „ *Do.,* Do. Do.
Stromateus sinensis. *Do.,* Chándava. Stuffed; also in spirits. *Arabi name,* Omalayta.
„ *cinereus.* *Do.,* Saranga. Do.
„ *niger.* *Do.,* Do. Do.
Coryphæna hippurus. Do.
Scomber microlepidota. In spirit. *Arabi name,* Mekha.
Cybium interruptum. *Do.,* Towar. Stuffed.
„ *guttatum.* *Do.,* Do. Do.
„ *commersonii.* *Do.,* Do. Do.
Elacate nigra. *Do.,* Sakala. Do.
Echeneis neucrates. *Do.,* Nachuk. Do.; also in spirits.
Echeneis albescens. Stuffed.

Sillago sihama. *Maráthi name,* Nudadi. Stuffed.
Batrachus grunniens. Bloch.
Antennarius hispidus. *Maráthi name,* Kend. In spirits.
Platycephalus macracanthus. *Do.,* Chorbombil. Stuffed.
„ *punctatus.* *Do.,* Do. Do.; also in spirits.
„ *scaber.* Stuffed.
„ *insidiator.* Do.
Dactylopterus orientalis. In spirits. *Arahi name,* Shashána.
Gobius ocellatus. *Maráthi name,* Kharbi. Do.
„ *striatus.* *Do.,* Do. Do.
„ *cristatus.* *Do.,* Do. Stuffed.
Boleophthalmus dussumieri. *Do.,* Nivti. In spirits.
„ *dentatus.* *Do.,* Do. Stuffed; also in spirits.
„ *boddœrti.* *Do.,* Khavla nivta. Do., also in spirits
Salarias periophthalmus. *Do.,* Chikoti. In spirits.
„ *kirkii.* *Do.,* Do. Do.
„ *frentatus.* *Do.,* Tengali. Do.
Sphyræna obtusata. *Do.,* Gánjya Tol. Stuffed.
„ *jello.* *Do.,* Joban Tol. Stuffed.
Mugil speigleri. *Do.,* Mángin. Do.
„ *parsia.* *Do.,* Do. Do.
„ *kelaartii.* *Do.,* Bhádavi. In spirits.
„ *oeur.* *Do.,* Do. Do.
Fistularia serrata. *Do.,* Tol. Stuffed.
Amphisile scutata. In spirits. *Arabi name,* Moasa.
Glyphidodon leucogaster. Stuffed.
„ *modestus.* Do.
„ *septemfasciatus.* Do.
„ *bengalensis.* Do.
Cheilinus cholorurus. Stuffed.
Platyglossus dussumieri. *Marátha name,* Chikoti. Do.
„ *dussumieri.* *Do.,* Do. Do.
„ *nebulosus.* *Do.,* Do. Do.
Julis lunaris. Stuffed.
Pseudoscarus æruginosus. Do.
Bregmaceros atripinnis. *Marátha name,* Tengali. In spirits.
Psettodes erumei. *Do.,* Bhakas. Stuffed.
Pseudorhombus arsius. *Do.,* Do. In spirits.
„ *javanicus.* Stuffed.

Platophrys pantherinus. Stuffed specimens; also in spirits.
Synaptura orientalis. Do.
„ *zebra.* *Maráthi name,* Sudi. Do.
Cynoglossus lingua. *Do.,* Nepati. In spirits.
„ *bengalensis.* *Do.,* Do. Stuffed.
Macrones vittatus. *Do.,* Chivana. In spirits.
„ *keletius.* *Do.,* Tengali. Do.
Rita hastata. Stuffed.
Arius nenga. *Maráthi name,* Shingálpetdda. Do.
Chaca lophioides. *Do.,* Godir. In spirits.
Plotosus canius. *Do.,* Nárshinglá. Stuffed.
„ *arab.* *Do.,* Do. Do.; also in spirits.
Saurida tumbil. *Do.,* Chorbombil. Do.
Harpodon nehereus. *Do.,* Bombil. In spirits.
Belone strongylurus. *Do.,* Tol. Stuffed.
Hemiramphus cantori. *Do.,* Toli. In spirits. *Arabi name,* Shovála.
„ *limbatus.* *Do.,* Do. Do. *Do.,* Do.
Exocœtus bahiensis. *Do.,* Flying Chiri. Stuffed; also in spirits.
Barbus pinnauratus. Stuffed.
„ *chrysopoma.* Do.
Nuria danrica (var. *alta*). *Maráthi name,* Káti. In spirits. *Arabi name,* Láha.
Barilius modestus. *Do.,* Do. Do. *Do.,* Laccya.
Chela untrahi (young). *Do.,* Dántál. In spirits.
Coilia dussumieri. *Do.,* Mándeli. Do.
Chatoessus chacunda. *Do.,* Nev. Stuffed specimens.
Dussumieria acuta. *Do.,* Kánat. In spirits. *Arabi name,* Tashivala.
Clupea sindensis. *Do.,* Do. In spirits.
„ *ilisha.* *Do.,* Do.
Pellona brachysoma. Stuffed specimens.
„ *indica.* Do.
Elops saurus. *Maráthi name,* Ghonas. In spirits.
Megalops cundinga. Stuffed specimens.
Uroconger lepturus. *Maráthi name,* Tolaka. In spirits.
Muraenesox cinereus. Stuffed specimen.
Murœna punctatofasciata. *Maráthi name,* Kilis. In spirits.
„ *pseudothysoidea.* *Do.,* Hesál. Do.
Syngnathus serratus. *Do.,* Vála. Stuffed specimens.
Gastrotokeus biaculeatus. *Do.,* Do. Do.

Triacanthus brevirostris. Maráthi name, Ghoda. Stuffed specimens.
Balistes stellatus. Do., Kend. Do.
Ostracion cornutus. Do., Do. Do.
„ *turritus. Do.,* Do. Do.
Tetrodon lineatus. Do., Do. Do.
„ *lunaris. Do.,* Do. In spirits.
„ *oblongus. Do.,* Do. Do.; two stuffed specimens.
„ *fluviatilis. Do.,* Do. In spirits.
Tetrodon immaculatus. Stuffed specimens.
Diodon hystrix. Do specimen.
Carcharias gangeticus. Stuffed specimen.
„ *dussumieri. Maráthi name,* Choti musi. In spirits.
Zygæna malleus. Stuffed specimen.
Stegostoma tigrinum. Maráthi name, Shinvála. Do.
Chiloscyllium indicum. Do., Bálavála. Do.
Rhynchobatus djeddensis. Do., Ránja. Do.
Astrape dipterygia. Do., Zinzina. In spirits.
Trygon uarnak. Do., Pákat. Stuffed specimen
„ *sephen. Do.,* Govál pákat. Do.
„ *bleekeri. Do.,* Pákat. Do.
Dicerobatis eregoodoo. Do., Shingpákat. Do.

DIVISION LII.

MARSH TORTOISE.

529 *Otis houbara. Maráthi name,* Kánsav. Stuffed.

SERPENTS.

Pelamys bicolor (The two coloured Snake). *Do.,* Pátár. In spirits.
Chersydrus fasciatus (The Banded Sea-Snake). Do.
Chersydrus, Sp. *Do.,* Ikhár. Do.

DIVISION LIII.

BIRDS.

530 Raptores. *Pandion haliætus* (Osprey). Male 1.
Haliætus leucogaster (Sea Eagle). Female 1.

Raptores. *Circus æruginosus.* Male 1, Young 1.
Haliastur indus. Male 1.
Ketupa ceylonensis. Male 1, Female 1.
Do. flavipes. Male 1, Female 1.

Insessores. *Pelargopsis amauropterus.* Male 1.
Halcyon smyrnensis. Male 1, Female 1.
Do. pileata. Male 1, Female 1.
Do. chloris. Male 2.
Alcedo bengalensis. Male 1, Female 1.
Ceryle rudis. Male 1, Female 1.

Grallatores. *Glarcola orientalis.* Male 1.
Do. lactea. Female 1.
Squatarola helvetica. Male 1.
Charadrius fulvus. Male 1, Female 1.
Ægialites geoffroyi. Male 1.
Do. mongola. Male 1, Female 1.
Do. cantianus. Male 1, Female 1.
Do. philippensis. Male 1, Female 1.
Lobivanellus goensis. Male 1, Female 1, Young 1.
Strepsilas interpres. Male 1, Female 1.
Hæmatopus ostralegus. Female 1.
Gallinago stenura. Male 1, Female 1.
Do. scolopacinus. Male 1, Female 1.
Do. gallinula. Male 1.
Numenius lincatus. Male 1.
Do. phæopus. Female 1.
Machetes pugnax. Male 1.
Tringa canutus. Female 1.
Do. subarquata. Male 1, Unknown 1.
Do. minuta. Male 1, Female 1.
Do. platyrhyncha. Male 1.
Rhyacophila glareola. Male 1, Female 1.
Totanus ochropus. Female 1.
Tringoides hypoleucus. Male 1, Female 1.
Totanus glottis. Male 1, Female 1.
Do. calidris. Male 1, Female 1.
Himantopus candidus. Male 1, Female 1.
Parra indica (*Metopidius indicus*). Male 2.
Hydrophasianus chirurgus. Unknown 2.

Grallatores. *Porphyrio poliocephalus.* Male 1, Female 1.
Fulica atra. Male 1, Female 1.
Gallinula chloropus. Female 1.
Erythra phœnicura. Male 1, Female 1.
Porzana bailloni. Male 1.
Hypotœnidia striata. Male 2.
Melanopelargus episcopus. Male 1, Female 1
Ardea cinerea. Young 1.
Do. purpurea. Young 1, Unknown 1.
Herodias torra. Unknown 2.
Do. garzetta. Female 1.
Buphus coromandus. Male 1.
Ardeola grayi. Male 1, Female 1.
Butorides javanica. Young 1, Unknown 1.
Ardetta cinnamomea. Male 2.
Nycticorax griseus. Male 1, Female 1.
Tantalus leucocephalus. Male 1, Female 1.
Platalea leucorodia. Female 1.
Anastomus oscitans. Unknown 1.
Ibis melanocephalus. Male 1.
Falcinellus igneus. Unknown 2.

Natatores. *Phœnicopterus roseus.* Female 1, Young 1.
Sarkidiornis melanonotus. Male 1.
Nettapus coromandelianus. Male 1, Female 1.
Spatula clypeata. Male 1.
Chaulelasmus streperus. Male 1.
Dafila acuta. Male 1, Female 1.
Mareca penelope. Male 1.
Querquedula crecca. Male 1.
Do. circia. Female 1.
Fuligula nyroca. Female 1.
Do. cristata. Male 2.
Podiceps minor. Male 1, Female 1.
Larus affinis. Female 1.
Do. ichthyætus. Male 1.
Do. brunnicephala. Male 1, Female 1.
Sterna anglica. Male 1.
Hydrochelidon hybrida. Male 1, Unknown 1.

Natatores. *Sterna albigena.* Male 1.
Do. saundersi. Male 1.
Do. madia. Male 1.
Thalasseus cristatus. Female 1.
Phalacrocorax fuscicollis. Young 2.
Do. pygmarus. Male 1, Female 1.
Plotus melanogaster. Male 1, Unknown 1.

NOTES ON A COLLECTION

OF

SPECIMENS FOR THE INTERNATIONAL FISHERIES EXHIBITION

Made within a radius of 30 *miles from Poona between* 1*st October*, 1882, *and* 10*th February*, 1883.

THE main waterways of the Poona Collectorate are the Nira, the Mutha, the Mula (these two combining between Poona and Kirkee and becoming), the Mutha-Mula, the Pauna, the Indráyani, the Andur, the Baum, the Gúr and the Kokuri. They all have their rise in the highlands which stretch in an arc from the south-west to the north of Poona. Excepting the first, they all join the Bhima within the limits of the collectorate, with a south-easterly course. The Bhima enters the Kistna River.

My collection has been made from the Mutha-Mula, the Indráyani, the Bhima, Lake Fife (formed by a dam across the Mutha River some ten miles from Poona), and the Talegaon and Parvati tanks.

From the middle of June, when the south-west monsoon sets in, until the end of October the rivers are in full volume. With the cessation of the monsoon they gradually subside, and, by March, present a series of pools connected by long reaches of feeble running streams. Some of these pools are long, deep and rocky, affording secure sanctuaries for fish; others are shallow, easily netted, or by temporary dams emptied in sections, and by the end of April have been divested of all fish-life.

During the monsoon every highland tributary is beset with basket traps or minute bag nets, and in the lower reaches are numerous artificial or natural dams or contractions of the waterway in which, during the temporary and final gradual subsidence of the

floods, are set immense bag nets with meshes varying from 2 in. at the mouth to ¼ in. at the bag.

I have frequently seen as much as 300 lb. weight of fish taken from one such net, composed of fish from 1 in. to several feet in length—the fry predominating—crushed into one mass by the force of stream, and many of the mature fish heavy with spawn and milt.

No legal private rights to fisheries seem to exist, but each respective village claims the river through its lands.

In some sacred *dohs* or pools—such as that at Deo, on the Indráyani River, some fifteen miles from Poona—the priests exercise very perfect control in preventing natives from fishing, and, in the absence of lawful legislation for the preservation of fishes, it would be an incalculable advantage to the population in general if these sacred sanctuaries, representing safe breeding beds, were more numerous.

The chief fishing classes are Maráthi Bhois and Koli Bhois, but very few of them live solely by fishing.

The majority of the population consumes fish.

Thirty kinds of fish offered for sale in the Poona market realize from 2 to 2½ annas per ser. Four kinds usually consumed by Europeans—*viz.*, *Vámbat* (*Mastacembelus armatus*), *Ahir* (*Anguilla bengalensis*), *Mural* (*Ophiocephalus leucopunctatus* or *striatus*), and *Shivada* or *Pari* (*Wallago attu*) realize 5 to 6 annas per ser.

I believe that were the fish supply to increase twenty fold it would not exceed the demand.

Some legislation for the protection of breeding and young fishes would become an immense boon—a perfect God-send—to the poorer classes of the population, and eventually a source of great benefit to the fishermen.

The majority of fishes breed towards the end of the monsoon.

Were all netting prohibited from 1st September to 30th November, mature breeding fish would not be destroyed, and the fry would increase accordingly; and, if from 1st December to end of March no nets with a smaller than one-inch mesh were used, a large supply of food would be obtained, while the fry would escape, and have time to grow, until between March and June it would yield an infinitely greater weight of food than if it had been destroyed in infancy.

In early life fish increase in weight with astonishing rapidity.

I believe that the legislation which I advocate would in the course of three years result in the fish-take being increased from ounces to pounds.

Amongst fishermen and the ignorant class of fish-consumers such legislation would doubtless engender discontent; but I feel convinced that the supply would increase so largely, and so many poor people would benefit by the results, that after a couple of years the wisdom of Government would be acknowledged and appreciated.

This question forms a splendid subject for the consideration of "Local Self-Governments."

"There are numerous tanks in the collectorate which are eminently suited for a systematic cultivation of fishes. It is as possible to cultivate water as land; and I have read that in China, where pisciculture has been a science for thousands of years, an acre of water is considered much more valuable than an acre of good land.

Here an acre of water, if not used for irrigation, is worth nothing.

Any tank within fifteen miles by road, or thirty miles by rail, of a European settlement might be made a source of revenue. Here we pay 5½ to 6 annas per ser for coarse, tasteless fish, which is double the price of good beef and one-fourth to half more than that of good mutton.

"Were the Gourami (*Osphromenus olfax*) introduced with some other non-predatory fish, the outlay would be trivial, and the produce would obtain a good market.

I have said that in this collectorate there are numerous suitable tanks, but I may mention two which appear to me particularly appropriate.

At Talegaon there is a very fine tank which, were it emptied at the end of the hot weather and thoroughly cleaned out, ensuring the total removal of all predacious species, might be stocked with Gourami with favourable results.

The Parvati tank might be similarly treated. Its water could always be maintained at a good level from the Lake Fife canal, but care would have to be taken that with the water no small fry of predatory fish gained access to the tank.

Lake Fife now teems with fish of a predacious nature, and I doubt much whether it would pay to introduce the Gourami there.

The nets chiefly used are—

1. Light casting nets, *Pagir* or *Bhor jāl.*
2. A heavy casting net of strong cord and large mesh for the capture of heavy fish in running water. A cord passing through the meshes at its outer diameter enables the mouth to be closed, confining a captured fish as it were in a bag. This net is usually drawn in mouth foremost. It is called *Sarki.*
3. Bag nets which are fixed in strong currents, generally artificially caused by the formation of rough stone dams with openings left therein—*Khavri.*
4. Nets varying in length, but often 500 ft. long and 2 ft. broad, of very fine cord and large mesh, so floated along the upper and lightly weighted along the lower margins that it remains in an upright position at or near the surface. Stretched across a pool it is left for some hours, usually the whole night, when fish attempting to pass it are entangled —*Bhuse.*
5. Another net, like *Bhuse,* differs in having larger meshes and being so weighted as to take it to the bottom of the pool. It is called *Tivari,* and captures large fish.
6. Drag nets 6 ft. to 8 ft. deep and varying in length, mesh and texture—floated at top and weighted at bottom, where there is a bag or pocket—*Pandi.*
7. A net fastened to a triangular frame of bamboo used in much the same way as the European shrimping net—*Jhile* or *Pelui.*
8. A "plunge" net—a bag net fixed to an iron or bamboo ring from which rise three bamboo rods which are fastened together at or near the tail of the net. Wading in the shallows the fisherman plunges the net to the bottom, then with his hands passed through the hole at the tail of it, captures any fish that are imprisoned—*Choba.*
9. *Lavkari* can only be described as a *bag-drag net.* It is often 70 to 80 ft. long, with its square mouth 30 ft. across and 10 ft. high. It requires as many as fifty men to work it. Is used only in deep still waters, and costs as much as 300 rupees.

Many simple modifications of these nets are called by other names.

Excepting the *Sarki* and the *Bhuse* and *Tivari*, which may be termed *entanglements*, the nets are mostly designed for the capture of very small fry.

According to Dr. Day's valuable work "The Fishes of India," there are between eighty and ninety species of fish which are more or less common "*throughout the fresh-waters of India*," and may, therefore, be looked for (though, of course it does not follow, be *found*) in the rivers and tanks of the Deccan. Of this number between thirty and forty only exceed 12 in. in length. The balance consist chiefly of small species.

I have succeeded in obtaining only forty-four species.

Turtles.—Several kinds abound in the rivers, and I have procured six specimens, representing, I believe, three species. They form an article of food amongst some castes.

Otters are not common, but from time to time I have observed them or their traces over the area from which my collection has been procured.

Crocodiles are fairly numerous, and, it is needless to say, do much damage in destroying fish. During the last six months I have heard of three cases of people being attacked and severely injured by crocodiles on the Bhíma. They are easily captured; and, were the method of doing so made known to the natives, and a fair reward offered for every one taken, fish would increase, and the danger to human beings lessen.

Of birds hostile to fish I have collected 123 specimens, representing seventy-five species. Fifty-seven species are common to the Deccan. The remaining eighteen species are from Rangoon, Amherst, Syriam and Ratnágiri, and were most kindly given to me by Mr. G. Vidal, C.S.

HENRY WENDEN.

DIVISION LI.

FISH.

531 *Ambassis nama. Maráthi name,* Gáude-chiri. In spirits.
Gobius giuris. Do., Kharpa. In spirits and stuffed.
Mastacembelus armatus. Do., Vámbat or Báhm. Stuffed.
Ophiocephalus striatus. Do., Dákhu. In spirits.
„ *leucopunctatus. Do.,* Maral. Stuffed.
„ *gachua.* Stuffed.
Macrones seenghala. Maráthi name, Seenghala or Shengal. Stuffed.
„ *corsula. Do.,* Kala Shengal. Stuffed.
„ *cavasius. Do.,* Shingti or Shingata. Stuffed.
Rita pavimentata. Do., Ghogra. Stuffed and in spirits.
„ *hastata. Do.,* Kurdu. Stuffed.
Pseudeutropius taakree. Do., Waidi or Váyadi. Stuffed and in spirits.
Callichrous bimaculatus. Do., Gugli. Stuffed.
„ *malabaricus. Do.,* Kala Gugli. Do.
Wallago attu. Do., Shivada or Pari. Do.
Bagarius yarrellii. Do., Muláuda or Tharota. Do.
Belone cancila. Do., Kutra. In spirits.
Discognathus lamta. Do., Malavya. Stuffed and in spirits.
Labeo fimbriatus. Do., Támbra. Stuffed.
„ *calbasu. Do.,* Kánoshi. Do.
„ *bata. Do.,* Royádi or tambte. Do.
„ *boggut. Do.,* Sánde. Do.
„ *nakta. Do.,* Nakta or nanktáshendva. Do.
„ *ariza* or *kawus. Do.,* Kavdasha. Do.
„ (?). In spirits.
Rasbora daniconius. Maráthi name, Dáudvan. Do.
Barbus sarana. Do., Kudali or pitule. In spirits and stuffed.
„ *dobsoni. Do.,* Páugat. Stuffed.
„ *tor. Do.,* Khadchi or másla. Do.
„ *pulchellus. Do.,* Khudra. Do.
„ *stigma. Do.,* Kudale. In spirits.
„ *chola. Do.,* do. Do.
„ *kolus. Do.,* Koolis or kholashi. Stuffed.

Barbus amphibius. Marátlıi name, Bhondgi. In spirits.
,, *ticto. Do.,* Do. Do.
Rohtee vigorsii. Do., Phek. Stuffed and in spirits.
Rohtee cotio or alfrediana. Do., Gud-dáni. In spirits.
Chela clupeoides. Do., Alkut. Do.
Lepidocephalichthys thermalis. Do., Chickani or mura. Do.
Nemacheilus sinuatus, and botia. Do., Teli-mura. Do.
,, *savona. Do.,* Mura. Do.
Notopterus kapirat. Do., Châlat or chambaree. Stuffed and in spirits.
Anguilla bengalensis. Do., Ahir. Stuffed and in spirits.

MISCELLANEOUS.

532 Fresh-water shrimps, in spirits.
Carnivorous water beetles, in spirits.
Insects taken from the gills of fishes, in spirits.
"Blood-sucking" neuts ?—*Pachyglossæ,* in spirits.
Several frogs.—*Rana cyanophlyctis,* in spirits.
Two stuffed frogs.—*Rana.*
Five fresh-water or land crabs.—*Telphusida.*
Skull of *Rita hastata,* found in *Anguilla bengalensis.*
One turtle (29 lb.).—*Trionyx javanicus.*
Three turtles (small).—*Do.*
One water tortoise (6½ lb.) ?—*Pangshura teutoria.*
Shell of very large turtle ?—*Chitra indica,* and skul
Branchial arches of 93½ lb.—*Bagarius yarrellii.*
Water snake.—*Tropidonotus quincunciatus,* in spirits.
One otter, set up.—*Lutra nair.*
One crocodile.—*Crocodilus palustris,* 5′ 9″ long.
Do.—*Do.,* 9′ 5″ long.

MODELS.

533 A group of four fishermen at work.
A figure, man watching bag net "Khasri."
A clay figure, man equipped for work.
Do., man throwing casting net.
Do., man watching basket trap in rice field.

SIND.

DIVISION LII.

REPTILES.

534. *Zamenis diadema.* Karáchi.
Psammosaurus scincus. Do.
Echis carinata. Do.
Uromastix hardwickii. Do.
Hydrophis sp. near *aspera.*
Eublepharis macularius. Joongshai.
Hydrophis lindsayi. Gray. Karáchi.
Hydrophis cyanocincta. Karáchi.
Enhydryna Bengalensis. Do.
Rana cyanophlictis. Kotri.
Zamenis ventrimaculatus. Dorbajee, Sind.
Psammophis leithi. Mulleer, Sind.
Dipsas trigonata. Karáchi.
Tropidonotus quincunciatus. Indus.
Tropidonotus stolatus. Karáchi.
Tropidonotus. Kotri.
Eryx johnii. Karáchi.
Gongylophis conicus. Jeempeer, Sind.
Cerberus rhynchops. Karáchi, Coast.
Hydrophis spiralis. Do.
Acanthodactylus cantoris. Karáchi and Kotri.
Pangshura sp. Indus, Sukkur.
Batagur thurgii. Do.
Rana, Sp. Tatta, Ponds.
Rana tigrina. Do.
Bufo viridis. Do.
Calotes versicolor. Karáchi
Gongylus ocellatus. Do.
Acanthodactylus micropholis. Do.
Varanus dracœna. Khetty.
Hemidactylus cocteani. Karáchi.
Emyda granosa. Tatta.
Python molurus. Karáchi.
Crocodilus palustris. Kalankote.

DIVISION LI.

FISH.

535 *Serranus diacanthus.* Karáchi. In spirit.
„ *tumilabrus.* Do.
„ *merra.* Do.
„ *fuscoguttatus.* Do.
„ *malabaricus.* Do.
Lutianus Johnii. Do.
„ *argentimaculatus.* Do.
Ambassis nama. Jerruck and Tatta.
„ *ranga.* Indus, Tatta, and Jerruck.
Apogon multitæniatus. Karáchi.
Therapon jarbua. Do.
Pristipoma hasta. Do.
„ *operculare.* Do.
„ *nageb.* Do.
„ *maculatum.* Do.
Diagramma cinctum. Do.
„ *griseum.* Do.
Gerres lucidus. Do.
Scatophagus argus. Do.
Drepane punctata. Do.
Chrysophrys berda. Do.
Scorpæna haplodactylus. Do.
Pterois russellii. Do.
Pseudosymanceia melanostigma. Do.
Polynemus tetradactylus. Do.
Sciæna albida. Do.
Caranx ciliaris. Do.
„ *kurra.* Do.
Caranx hippos. Karáchi.
„ *gallus.* Do.
„ *rottleri.* Do.
Chorinemus lysam. Do.
Trachynotus bailloni. Do.
„ *ovatus.* Do.
Equula ruconius. Do.
Scomber microlepidotus. Do
Cybium kuhlii. Do.
„ *guttatum.* Do.
Elacate nigra. Do.
Sillago sihama. Do.
Batrachus grunniens. Do.
Antennarius marmoratus. Do.
Platycephalus insidiator. Do.
Gobius planifrons. Do.
„ *giuris.* Tatta and Jerruck, Khetty.
„ *ocellatus.* Do.
Petroscirtes bipunctatus. Karáchi.
Salarias dussumieri. Do.
Mastacembelus armatus. Tatta.
„ *pancalus.* Do.
Rhynchobdella aculeata. Indus.
Mugil oeur. Karáchi.
„ ? Khetty backwater.
„ *carinatus.* Karáchi.
Ophiocephatus striatus. Kinjhar Lake.
„ *punctatus.* Tatta.
„ *marulius.* Do.

Ophiocephatus striatus. Indus.
Trichogaster fasciatus. Do.
Glyphidodon cœlestinum. Karáchi.
Platyglossus dussumieri. Do.
„ *bimaculatus.* Do.
Pseudorhombus arsius. Do.
Platyphrys pantherinus. Do.
Synaptura orientalis. Do.
Macrones bleekeri. Do.
„ *seenghala.* Do.
„ *tengara.* Tatta.
„ *cavasius.* Jerruck and Indus.
Arius gagora. Karáchi.
Pseudeutropius atherinoides. Tatta.
„ *goongwaree.* Terruck.
Callichrous canio. Tatta.
„ *bimaculatus.* Do.
„ *pabda.* Jerruck.
Wallago attu. Tatta.
Saccobranchus fossilis. Tatta and Jerruck.
Eutropiichthys vacha. Jerruck.
Gagata cenia. Do.
Nangra viridescens. Indus.
Saurida tumbil. Karáchi.
Saurus ? Do.
Belone cancila. Jerruck.
„ *strongylurus.* Karáchi.
Hemiramphus far. Do.
„ *xanthopterus.* Do.
Labeo rohita. Tatta and Kinjhar.
„ *bata.* Kinjhar.
„ *calbasu.* Kinjhar lake.
„ *cursa.* Tatta.
„ *pangusia.* Jerruck.
Labeo gonius. Tatta.
„ *nigrescens.* Jerruck.
Cirrhina reba. Indus, Jerrick, and Tatta.
„ ? Indus.
„ *mrigala.* Kinjhar and Tatta.
„ ? Do.
„ ? Jerruck.
Catla Buchanani. Karáchi.
Barbus sarana. Kinjhar.
„ *chola.* Jerruck.
„ *punjabensis.* Sinda.
„ *stigma.* Jerruck.
„ *ticti.* Jerruck and Karáchi.
Barilius evezardi. Do.
„ *barila.* Do.
Nuria danrica. Tatta.
Rohtee cotio. Sonda, Indus, and Karáchi.
Perilampus atpar. Jerruck.
Chela bacaila. Do.
Engraulis hamiltonii. Karáchi.
„ *malabaricus.* Indus.
Chatoessus chacunda. Karáchi.
„ *nasus.* Do.
Clupea longiceps. Do.
„ *fimbriata.* Do.
„ *chapra.* Jerruck.
„ *ilisha.* Do.
Notopterus kapirat. Tatta.
Elops saurus. Karáchi.
Chirocentrus dorab. Do.
Ophichthys boro. Do.
Muræna ? Do.
„ *thrysoidea.* Do.
„ *pseudothysoidea.* Do.
Syngnathus spicifer. Khotty.

Tetrodon patoca. Karáchi.
Scyllium ? Do.
Galeocerdo Rayneri. Do.
Rhinobatis djeddensis. Karáchi.
Narcine timlei. Do.
Œtobatis narinari. Do.

DIVISION L.

CRUSTACEA.

536
Ocypoda. Karáchi.
Pagurus. Do.
Squilla. Do.
Goniodactyla. Do.
Alphœus. Do.
„ ? Do.
Grapsus. Do.
Lupea sanguinolenta. Do.
Eriphia. Do.
Platycheles. Do.
Palœmon. Indus, Kotri.
Gelasimus. Karáchi.
Thalamita ? Do.
Calappa ? Do.
Grapsus ? Do.
Acanthonyx ? Do.
Palœmon. Indus, Kotri.
Hippolyte. Karáchi.
Gammarus. Do.
„ Do.
Gelasimus. Do.
Palinurus. Do.
Cancer. Do.
Thalamita. Do.
Ocypoda. Karáchi.
Xantho. Do.
Mithrax. Do.
Thelphusa, Sp. Indus, Gharko.
„ *Sp.* Quetta. Beluchistan.
Platycheles. Karáchi.
Macropodida, Fam. Do.
Grapsus. Do.
Palœmon. Sonda Dhunds.
„ Do.
„ Jerruck Ponds.
Penœus. Do.
Palœmon. Do.
Penœus. Do.
„ *indicus.* Karáchi.
„ *Sp.* Do.
„ *monodon.* Do.
„ *Sp.* Do.
„ *Phillipi* ? Do.
„ Do.
Palœmon. Do.
„ Do.

DIVISION XLVI.

MOLLUSCS.

537
Pyrula reticulatus. Karáchi.
Eburnea zeylandica. Do.
Pyrula bulbosa. Karáchi.
Natica lineata. Do.

Trochus incrassatus. Karáchi.
Nassa coronata. Do.
Turbo coronatus. Do.
Sepia. Do.
Octopus. Do.
Ranella tuberculata. Coast.
Nassa lentiginosus. Do.
Ricinula heptagonale. Do.
Columbella terpsichore. Do.
Siliqua radiata. Do.
Tapes. Do.
Cerithium bornii. Do.
Planorbis exustus. Do.
Donax scortum. Do.
Phorus corrugatus. Do.
Solarium perspectivum. Do.
Purpura persica. Do.
,, *carinifera.* Do.
Lutraria papyracea. Do.
Cerithium rugosum. Do.
Tympanotonus fluviatilis. Do.
Purpura fissoli. Do.
Trochus australis. Do
Turbo coronatus. Do.
Trochus tricarinatus. Do.
Nerita albicilla. Do.
,, *ustulata.* Do.
Turbo intercostalis. Do.
Rostellaria curta. Do.
Trochus scabrosus. Do.
Natica lamarckiana. Do.
Pollia spiralis. Do.
Cardium lata. Do.
Sistrum undatum. Do.
,, *tuberculatum.* Do.
Pyrazus palustris. Do.
Purpura. Do.
Cuma thiarella. Do.
Natica mamilla. Do.
Trochus asper. Coast.
,, Do.
Natica maculosa Do.
Dosinia prostrata. Do.
Rotella, Sp. Do.
Purpura bufo. Do.
Pupa insularis. Do.
Cyprœa arabica. Do.
,, *turdus.* Do.
,, *moneta,* Var. Do.
Oliva gibbosa. Do.
Cyprœa turdus, Var. Do.
Eburnea zeylanica. Do.
Strombus urceus. Do.
Bulla ampulla. Do.
Conus lividus. Do.
Arca, Sp. Do.
Rostellaria curta. Do.
Trochus, Sp. Do.
Murex ternispina. Do.
Vertagus sinensis. Do.
Cyprœa pallida and Var. Do.
Nassa persica. Do.
Pyrula bulbosa. Do.
Nassa coronata. Do.
Pleurotoma nodifera. Do.
Auricula coniformis. Do.
Columbella (prox.) gangetica. Do.
Mitra procissa. Do.
Pyrula pugilina. Do.
Ranella spinosa. Do.
Paludina bengalensis. Do.
Tapes laterisulca. Do.
Arca, Sp. Do.
Mya, Sp. Do.
Nassa coronata. Do.
Cyprœa lynx. Do.
Cytherea casta. Do.
Arca. Do.

Patella. Coast.
Oliva hiaticula. Do.
Tapes. Do.
Arca tenebrica. Do.
Cardita calyculata? Do.
Arca obliquata. Do.
Hydatina vexillum. Do.
Mytilus. Do.
Psammobia. Do.
Arca granosa. Do.
Tapes malabarica. Do.
Stomatella imbricata. Do.
Hydatina physis. Do.
Cytherea ceylonensis. Do.
Amphidesma. Do.
Hydatina. Do.
Columbella terpsichore. Do.
Cypræa vitellus. Do.
Cypræa pulchra. Coast.
„ *ocellata.* Do.
„ *caputserpentis.* Do.
Atys naucum. Do.
Purpura, Sp. Do.
Mactra, Sp. Do.
Limnea. Do.
Unio marginalis. Do.
Natica lineata. Do.
Dentalium octogonum. Do.
Melania tuberculata, Var. Do.
Sanguinolaria diphos. Do.
Pecten. Do.
Pteroceras. Do.
Lingula anatina. Do.
Strombus lentiginosus. Do.
Aplysia. Do.

DIVISION XLVII.

ECHINODERMATA.

538 *Asterias.* Karáchi.
„ *burtoni.* Do.
Ophioplocus imbricatus. Karáchi.
Antedon savignyii. Do.

ECHINIDÆ.

Mespilia globulus. Karáchi.
„ Do.
Mespilia. Karáchi.

HOLOTHURIÆ.

Cavernularia, Sp. Karáchi.
Cavernularia obesa. Karáchi.

DIVISION XLVI.

ZOOPHYTES.

539 *Xenia, Sp.* Karáchi. *Aglaophenia.* Karáchi.

JAMES A. MURRAY.

DIVISION LI.

SPECIMENS OF FISH FROM INDIA AND THE INDIAN OCEAN.

EXHIBITED BY

DEPUTY SURGEON-GENERAL FRANCIS DAY, F.L.S., F.Z.S.

540 *Lates calcarifer.* Bloch. Mangalore.
Cromileptes altivelis. Cuv. and Val. Malay Archipelago.
Serranus stoliczkæ. Day. Aden.
„ *coromandelicus.* Day. Madras.
„ *leucogrammicus.* Cuv. and Val. Malay Archipelago.
„ *maculatus.* Bloch. Madras.
„ *tumilabris.* Cuv. and Val. Karáchi.
„ *diacanthus.* Do. Bombay.
„ *undulosus.* Do. Madras.
„ *sex fasciatus.* V. Hass. Malay Archipelago.
„ *malabaricus.* Bl. Schn. Madras.
„ *gilberti.* Richards. Malay Archipelago.
„ *pardalis.* Bleeker. Batavia.
„ *morrhua.* Cuv. and Val. Madras.
„ *angularis.* Do. Celebes.
„ *nebulosus.* Do. Batavia.
„ *bocnack.* Bloch. Madras.
„ *miniatus.* Forsk. Malabar.
„ *sonnerati.* Cuv. and Val. Madras.
„ *hoevenii.* Bleeker. Malay Archipelago.
„ *crepao.* Malay Archipelago.

Myriodon waigiensis. Quoy and Gaim. Malay Archipelago.
Variola louti. Forsk. Do.
Grammistes orientalis. Bl. Schn. Do.
Lutianus dodecacanthus. Bleeker. Madras.
„ *rivulatus.* Cuv. and Val. Andamans.
„ *argentimaculatus.* Forsk. Madras.
„ *quinquelineatus.* Bloch. Andamans.
„ *fulviflamma.* Forsk. Akyab and Madras.
„ *Russellii.* Bleeker. Akyab.
„ *johnii.* Bloch. Madras.
„ *macolor.* Cuv. and Val. Malay Archipel.
Priacanthus holocentrum. Bleeker. Madras.
Ambassis nama. H. B. Bombay.
„ *ranga.* H. B. India.
„ *baculis.* Ham. Buch.
„ *Commersonii.* Cuv. and Val. Madras.
Apogon multitæniatus. Bleeker. Malay Archipel. and Karáchi.
„ *fasciatus.* White. Malay Archipel.
„ *nigripinnis.* Cuv. and Val. Madras.
„ *bifasciatus.* Rüppel. Madras.
„ *annularis.* Russell. Amboina.
„ *Ellioti.* Day. (= *A. arafuræ,* Günther, Challenger). Madras.
Odontonectes erythrogaster. Cuv. and Val. Batavia (Bleeker's Collection).
Dules rupestris. Lacép. Malay Archipel.
Therapon puta. Cuv. and Val. Madras.
„ *jarbua.* Forsk. Madras and Calcutta.
„ *theraps.* Cuv. and Val. Madras.
Pristipoma olivaceum. Day. Sind.
„ *maculatum.* Bloch. Madras.
„ *operculare.* Playfair. Karáchi.
Diagramma lineatum. Linn. Malay Archipel.
„ *orientale.* Bloch. Do.
„ *cinctum.* Tem. and Schleg. Sind.
„ *pictum.* Thunb. Series 1½, 2⅓, 3¼, 5 from Bleeker's Collection; 4½ and 7 in Madras.
Scolopsis margaritifer. Cuv. and Val. Malay Archipel.
„ *bilineatus.* Bloch. Malay Archipel. and Andamans.

Scolopsis ghanam. Forsk. Andamans.
„ *monogramma.* Cuv. and Val. Batavia (Bleeker's Coll.).
„ *cancellatus.* Do. Malay Archipelago.
„ *ciliatus.* Lacép. Amboina and Andamans.
Synagris tolu. Cuv. and Val. Madras.
„ *notatus.* Day. Andamans.
Cæsio erythrogaster. Cuv. and Val. Batavia.
Datnioides polota. H. B. Calcutta.
Gerres filamentosus. Cuv. and Val. Madras.
Chætodon baronessa. Do. Amboina.
„ *meyeri.* Bl. Schn. Malay Archipel.
„ *oligacanthus.* Bleeker. Batavia (type).
„ *vagabundus.* Linn. Malay Archipel.
„ *punctato-fasciatus.* Cuv. and Val. Do.
„ *Rafflesii.* Bleeker. Do.
„ *kleinii.* Bloch. Do.
„ *citrinellus.* Cuv. and Val. Amboina.
„ *lunula.* Lac. Amboina.
„ *virescens.* Cuv. and Val. Amboina (Bleeker's Coll.).
„ *vittatus.* Bl. Schn. Malay Archipel.
„ *unimaculatus.* Bl. Amboina (Bleeker's Coll.).
„ *collaris.* Bl. Malay Archipel.
„ *melanotus.* Bl. Schn. Do.
„ *octofasciatus.* Gm. Linn. Solomon Islands.
Chelmo longirostris. Brouss. Malay Archipel.
Heniochus chrysostomus. Parkins. Do.
Zanclus cornutus. Linn. Ternate.
Holacanthus nicobariensis. Bl. Schn. Malay Archipel.
„ *vrolikii.* Bleeker. Amboina.
„ *annularis.* Bl. Malay Archipel.
„ *lamarkii.* Lacép. Do.
„ *diacanthus.* Bl. Schn. Solomon Islands.
„ *mesoleucus.* Bloch. Malay Archipel.
„ *semicirculatus.* Cuv. and Val. Do.
Scatophagus argus. Gm. Linn. Madras.
Drepane punctata. Do. Madras.
Upeneoides sulphureus. Cuv. and Val. Madras.
Badis buchanani. Bleeker. Bowany and Gowhatty.
Pristolepis marginatus. Jerdon. Madras.

Crenidens indicus. Day (= *C. macracanthus,* Günther). Sind.
Lethrinus opercularis. Cuv. and Val. Batavia (Bleeker's Coll.).
Pagrus spinifer. Forsk. Madras.
Chrysophrys datnia. H. B. Sind.
„ *cuvieri.* Day. Madras.
Cirrhites Forsteri. Bl. Schn. Malay Archipelago.
Cirrhitichthys marmoratus Lacép. Madras.
„ *graphidopterus.* Bleeker. Malay Archipel.
Sebastes guamensis. Quoy and Gaim. Amboina (Bleeker as *S. polylepis*).
Scorpœna haplodactylus. Bleeker (Type Bleeker Coll.).
„ *cirrhosa.* Amboina.
Pterois Russellii. Bennett. Madras.
„ *zebra.* Cuv. and Val. Malay Archipel.
„ *volitans.* Linn. Madras.
Apistus barbatus. Cuv. and Val. Malay Archipel.
Synancidium horridum. Linn. Do.
Synanceia verrucosa. Bl. Schn. Do.
Pseudosynanceia melanostigma. Day. Karáchi.
Teuthis Java. Linn. Madras.
„ *virgata.* Cuv. and Val. Malay Archipel.
„ *corallina.* Do. Do.
„ *dorsalis.* Do. Do.
„ *oramin.* Bl. Schn. Madras.
Holocentrum diadema. Lacép. Malay A...
„ *cornutum.* Bleeker. Do.
„ *sammara.* Forsk. Do.
Kurtus indicus. Bloch (Male 5 in., Female, 4 in.). Malay Archipel.
Polynemus sextarius. Bl. Schn. Sind.
„ *Indicus.* Shaw. Madras.
„ *tetradactylus.* Do. Calcutta.
Umbrina Russellii. Cuv. and Val. Bombay.
Sciœna miles. Lacép. Malabar.
„ *vogleri.* Bleeker. Madras.
„ *sina.* Cuv. and Val. Bombay.
„ *coitor.* H. B. Burma.
„ *albida.* Cuv. and Val. Canara.
„ *diacanthus.* Lacép. (var. *maculatus*). Madras.

Sciæna maculata. Bl. Schn. Madras.
„ *Belengeri.* Cuv. and Val. Bombay.
„ *semiluctuosa.* Do. Do.
„ *glaucus.* Day. Malabar.
„ *osseus.* Do. Do.
Sciænoides pama. H. B. Calcutta.
„ *brunneus.* Day. Bombay.
Otolithus argenteus. Cuv. and Val. Madras.
Trichiurus haumela. Forsk. Madras and Bombay.
Acanthurus lineatus. Gm. Linn. Andamans.
„ *matoides.* Cuv. and Val. Do.
„ *hepatus.* Linn. Malay Archipel.
„ *glaucopareus.* Amboina.
Caranx Rottleri. Bloch. Madras.
„ *kurra.* Cuv. and Val. Do.
„ *carangus.* Bloch. Do.
„ *crumenophthalmus.* Do. Madras and Andamans.
„ *affinis.* Rüpp. Madras.
„ *calla.* Cuv. and Val. Do.
„ *ire.* Do. Malay Archipelago as *Caranx præustus* (Bleeker's Coll.).
„ *atropus.* Bl. Schn. Madras.
„ *armatus.* Forsk. Malabar.
„ *gallus.* Linn. Madras.
„ *leptolepis.* Cuv. and Val. Do.
„ *nigripinnis.* Day. Do.
„ *speciosus.* Forsk. Do.
„ *malam.* Bleeker. Malay Archip. (Bleeker's Coll.).
Micropteryx chrysurus. Linn. Do.
Chorinemus sancti-Petri. Cuv. and Val. Madras.
„ *moadetta.* Do. Do.
„ *lysan.* Forsk. Madras and Calcutta.
Trachynotus ovatus. Linn. Madras.
Platax teira. Forsk. Andamans.
Psenes indicus. Day 1870 (=*P. Javanicus,* pt. Günther, 1876, not Cuv. and Val.). Madras.
Equula splendens. Cuv. Do.
„ *lineolata.* Cuv. and Val. Do.
„ *insidiatrix.* Bloch. Madras and Sind.

Equula ruconius. H. B. Madras.
Gazza æquulæformis. Rüpp. Do.
Lactarius delicatulus. Cuv. and Val. Malabar.
Stromateus sinensis. Euphrasin. Bombay.
„ *niger.* Bloch. Madras.
Scomber microlepidotus. Rüpp. Madras and Andamans.
„ *loo.* Cuv. and Val. Malay Archipel. (Bleeker's Coll.).
Cybium kuhlii. Cuv. and Val. Sind.
„ *guttatum.* Bl. Schn. Madras.
„ *commersonii.* Lacép. Do.
Elacate nigra. Bloch. Do.
Echeneis neucrates. Linn. Andamans.
Uranoscopus guttatus. Cuv. and Val. Madras.
Ichthyscopus inermis. Do. Malabar.
Percis cylindrica. Bl. Amboina.
„ *tetracanthus.* Lacép. Do.
„ *hexophthalmus.* Cuv. and Val. Do.
Sillage panijius. H. B. (=*S. domina,* Cuv. and Val.). Calcutta.
„ *sihama.* Forsk. Madras and Akyab.
Batrachus grunniens. Bloch. Malabar, Bombay.
Antennarius hispidus. Bl. Schn. Madras.
Platycephalus scaber. Linn. Madras, Port Blair.
„ *micracanthus.* Bleeker. Madras.
„ *insidiator.* Forsk. Calcutta.
„ *punctatus.* Cuv. and Val. Sind and Malabar.
Dactylopterus orientalis. Do. Malay Archipel.
Pegasus natans. Malay Archipel.
Gobius Bynoensis. Richards. Do.
„ *brevirostris.* Günther. Sind.
„ *griseus.* Day. Madras.
„ *polynema.* Bleeker. Bombay.
„ *viridipunctatus.* Cuv. and Val. Do.
„ *chrysostigma.* Bleeker. Malay Archipel. (one of types).
„ *ocellatus.* Day. Bombay.
„ *Masoni.* Do. Do.
„ *cyanomos.* Bleeker. Do.
„ *criniger.* Cuv. and Val. Madras.
„ *puntang.* Bleeker. Andamans.
„ *biocellatus.* Cuv. and Val. Madras.

Gobius madraspatensis. Day. Madras.
„ *neillii.* Do. Do.
„ *melanosticta.* Do. Do.
„ *cristatus.* Do. Bombay.
„ *tentacularis.* Cuv. and Val. Do.
„ *acutipinnis.* Do. Madras.
„ *striatus.* Day. Malabar.
„ *personatus.* Bleeker. Orissa.
„ *ornatus.* Rüpp. Nicobars.
„ *albopunctatus.* Cuv. and Val. Andamans.
„ *giuris.* H. B. Madras.
„ *planiceps.* Day. Do.
„ *sadanundio.* H. B. Rangoon.
Gobiodon quinque-strigatus. Cuv. and Val. Nicobars.
„ *erythrospilus.* Bleeker. Andamans.
„ *citrinus.* Rüpp. Nicobars.
Sicydium griseum. Day. Canara.
Apocryptes rictuosus. Cuv. and Val. Madras.
„ *Bleekeri.* Day. Do.
„ *lanceolatus.* Bl. Schn. Do.
„ *bato.* H. B. Calcutta.
Apocryptichthys cantoris. Day. Madras.
Periophthalmus koelreuteri. Bl. Schn. Sind, Burma, Canara.
„ *Schlosseri.* Pall. Burma.
Boleophthalmus tenuis. Day. Sind.
„ *Dussumieri.* Cuv. and Val. Do.
„ *dentatus.* Do. Do.
„ *glaucus.* Day. Andamans.
„ *boddaerti.* Pall. Bombay, Burma.
Bostrichthys sinensis. Lacép. Andamans.
Eleotris porocephalus. Cuv. and Val. Do.
„ *macrodon.* Bleeker. Akyab.
„ *macrolipidotus.* Cuv. and Val. Andamans.
„ *ophiocephalus.* Do. Do.
„ *aporos.* Bleeker. Malay Archipel. (from Bleeker Coll.).
„ *cavifrons.* Blyth.
„ *fusca.* Bl. Schn. Calcutta.
„ *Canarensis.* Day. Canara.
„ *cantoris.* Blyth. Andamans.

Elotris butis. H. B. Calcutta.
„ *amboinensis.* Bleeker. Andamans.
Gobioides cœculus. Bl. Schn. Do.
„ *buchanani.* Day. Calcutta.
„ *rubicundus.* H. B. Madras.
„ *tenuis.* Day. Sind.
Trypauchen vagina. Bl. Schn. Calcutta.
Blennius steindachneri. Day. Sind.
Petroscirtes bipunctatus. Do. Do.
„ *Lienardi.* Do. Do.
Salarias tridactylus. Bl. Schn. Do.
„ *fuscus.* Rüpp. Do.
„ *oryx.* Do. Red Sea.
„ *andersonii.* Day. Ceylon.
„ *quadricornis.* Cuv. and Val. Andamans.
„ *lineatus.* Do. Do.
„ *andamanensis.* Day. Do.
„ *dussumieri.* Cuv. and Val. Do.
„ *periophthalmus.* Do. Do.
„ *unicolor.* Rüpp. Sind.
„ *alboguttatus.* Cuv. and Val. Andamans.
Andamia expansa. Blyth. Andamans, Amboina (type of *Salarias heteropterus,* Bleeker).
Tripterigium trigloides. Bleeker. Malay Archipel.
Rhynchobdella aculeata. Bl. Sind.
Mastacembelus unicolor. Cuv. and Val. Mandalay.
„ *zebrinus.* Blyth. Burma.
„ *pancalus.* H. B. Calcutta.
„ *armatus.* Lacép. Calc., Sind.
„ *guentheri.* Day. Malabar.
Sphyræna jello. Cuv. and Val. Madras.
„ *forsteri.* Do. Malay Archipel.
„ *obtusata.* Do. Madras.
Atherina melanostigma. Day. Do.
Magil speigleri. Bleeker. Bombay.
„ *cunnesius.* Cuv. and Val. Do.
„ *carinatus.* Do. Do.
„ *planiceps.* Do. Calcutta.
„ *parsia.* H. B. Calc.; and as *Mugil cantoris.* Bleeker (type).

Mugil belanak. Bleeker. Bombay.
„ *poicilus.* Day. Do.
„ *kelaartii.* Günther. Andamans.
„ *Jerdoni.* Day. Bombay.
„ *Dussumieri.* Cuv. and Val. Madras.
„ *oeur.* Forsk. Bombay.
„ *corsula.* H. B. Calcutta.
„ *Hamiltonii.* Day. Burma.
„ *cascasia.* H. B. Delhi.
„ *cœrulo-maculatus.* Lacép. Bombay.
„ *Borneensis.* Bleeker. Do.
„ *Troschellii.* Do. Madras.
„ *oligolepis.* Do. Calcutta.
„ *waigensis.* Quoy and Gaim. Madras.
Amphisile strigata. Malay Archipel.
Ophiocephalus marulius. H. B. Suddya, Assam.
„ *leucopunctatus.* Sykes. Canara.
„ *barca.* H. B. Calcutta.
„ *micropeltes.* Cuv. and Val. (series). Canara.
„ *striatus.* Bloch. Calcutta.
„ *stewartii.* Playfair. Assam.
„ *gachua.* H. B. Madras.
„ *punctatus.* Bloch. Do.
„ *affinis.* Assam.
„ *lucius.* Malay Archipel.
Anabas scandens. Dald. Calcutta.
Osphromenus trichopterus. Pallas. Malay Archipel
Trichogaster labiosus. Day. Burma.
„ *parvipinnis.* Sauvage. Siam (type, Paris Museum).
Betta pugnax. Pinang.
Amphiprion ephippium. Bl. Nicobars.
„ *sebæ.* Bleeker. Malay Archipel.
Premnas biaculeatus. Bl. Do.
Tetradrachmum aruanum. Linn. Andamans.
„ *polyacanthus.* Malay Archipel.
Pomacentrus trimaculatus. Cuv. and Val. Do.
Glyphidodon zonatus. Do. Do.
„ *septemfasciatus.* Do. Bombay.
„ *cœlestinus.* Do. Do.

Glyphidodon Dickii. Lienard. Malay Archipel.
„ *trimaculatus.* Rüpp. Do.
„ *leucogaster.* Bleeker. Do.
„ *sordidus.* Batavia.
Chœrops ancharago. Bloch. Nicobars.
Cossyphus mesothorax. Bl. Schn. Malay Archipel.
Cheilinus chlorurus. Bloch. Andamans.
„ *trilobatus.* Lacép. Do.
„ *fasciatus.* Bloch. Batavia.
„ *oxycephalus.* Malay Archipel.
Anampses meleagris. Cuv. and Val. Amboina.
Hemigymnus melapturus. Bl. Andamans.
Stethojulis strigiventer. Bennett. Malay Archipel.
Platyglossus notopsis. Bleeker. Do.
„ *Schwartzii.* Do. Do.
„ *Hoevenii.* Bleeker. Batavia.
„ *Hartzfeldii.* Do. Amboina.
„ *hortulanus.* Lacép. Malay Archipel.
„ *scapularis.* Bennett. Andamans.
„ *poecilus.* Richards. Malay Archipel.
Novacula pentadactyla. Linn. Do.
Julis trilobatus. Lacép. Amboina.
„ *Jansenii.* Bleeker. Do.
Cheilio inermis. Forsk. Malay Archipelago.
Coris greenoughii. Bennett. Do.
Pseudoscarus chrysopoma. Bleeker. Batavia.
„ *æruginosus.* Cuv. and Val. Andamans.
Etroplus canarensis. Day. Canara.
„ *maculatus.* Bloch. Madras.
„ *suratensis.* Do. Do.
Bregmaceros atripinnis. Tickell. Bombay.
Psettodes erumei. Bl. Schn. Madras.
Pseudorhombus arsius. H. B. Do.
„ *triocellatus.* Bl. Schn. Do.
Platophrys pantherinus. Rüpp. Andamans.
Solea heterorhina. Bleeker. Do.
„ *elongata.* Day. Madras.
„ *ovata.* Richardson. Do.
Achirus pavoninus. Lacép. Amboina.

Synaptura Commersoniana. Lacép. Sind.
„ *albomaculata.* Kaup. Madras.
„ *cornuta.* Cuv. Do.
Plagusia bilineata. Bl. Do.
Cynoglossus lingua. H. B. Calcutta.
„ *oligolepis.* Bleeker. Madras.
„ *macrolepidotus.* Do. Do.
„ *dispar.* Day. Sind.
„ *quadrilineatus.* Bleeker. Madras.
„ *brachyrhynchus.* Do. Moulmein.
„ *Bengalensis.* Do. Calcutta.
„ *Hamiltonii.* Günther. Madras.
„ *puncticeps.* Richards. Canara.
„ *brevis.* Günther. Sind.
Pseudobagrus aurantiacus. Japan (one of Bleeker's types).
Macrones chryseus. Day. Malabar.
„ *aor.* H. B. Calcutta.
„ *seenghala.* Sykes. Delhi.
„ *gulio.* H. B. Calcutta.
„ *micracanthus.* Java (Bleeker's Collection).
„ *punctatus.* Jerdon. Bowany, Madras.
„ *corsula.* H. B. Ghowhatty, Assam.
„ *microphthalmus.* Day. Burma.
„ *cavasius.* H. B. Lingasagoor, Deccan.
„ *oculatus.* Cuv. and Val. Malabar.
„ *vittatus.* Bloch. Madras.
„ *leucophasis.* Blyth. Bassein.
„ *montanus.* Jerdon. Wynaad.
„ *wolfii.* Java (Bleeker's Collection).
„ *keletius.* Cuv. and Val. Coimbatoor.
„ *malabaricus.* Day. South Canara.
„ *armatus.* Day. Canara.
„ *Bleekeri.* Day. Seharunpore.
„ *nemurus.* Cuv. and Val. Java (Bleeker's Coll.).
Leiocassis rama. H. B. Assam.
Erethistes hara. H. B. Do.
„ *conta.* H. B. Burma.
Rita Buchanani. Bleeker. Lahore.
„ *hastata.* Val. Poona.

Bagrus nemurus. Bl. Java.
Arius Burmanicus. Day. Moulmein.
„ *cœlatus.* Cuv. and Val. Bombay.
„ *acutirostris.* Day. Irrawaddy.
„ *subrostratus.* Cuv. and Val. Canara.
„ *sagor.* H. B. Moulmein.
„ *sona.* H. B. Calcutta.
„ *schlegelii.* Bleeker. Amoy, China (one of Bleeker's type).
„ *serratus.* Day. Sind.
„ *thalassinus.* Rüpp. Andamans.
„ *pidada.* Bleeker. Java (one of the types).
„ *falcarius.* Richardson. Bombay.
„ *gagora.* H. B. Calcutta.
„ *jatius.* H. B. Burma.
„ *maculatus.* Thunb. Java.
„ *Dussumieri.* Cuv. and Val. Malabar.
Hemipemilodus Peronii. Bombay.
Batrachocephalus mino. H. B. Malabar.
„ *micropogon.* Bleeker. Java (one of the types).
Osteogeniosus militaris. Linn. Bombay.
Pangasius Buchanani. Cuv. and Val. Calcutta.
Pseudeutropius taakree. Sykes. Kurnool.
„ *acutirostris.* Day. Burma.
„ *murius.* H. B. Orissa.
„ *Sykesii.* Jerdon. Cottayam.
„ *atherinoides.* Bl. Calcutta.
„ *garua.* H. B. Calcutta.
Olyra burmanica. Day. Pegu.
Cryptopterus bicirris. Bleeker. Java (Bleeker's Coll.).
Callichrous bimaculatus. Bl. Calcutta.
„ *pabo.* H. B. Burma.
„ *macrophthalmus.* Blyth. Burma.
„ *malabaricus.* Cuv. and Val. Malabar.
„ *pabda.* H. B. Sind.
Wallago attu. Bl. Schn. Calcutta.
Silurus wynaadensis. Day. Wynaad.
„ *afghana.* Günther. Darjeeling.
„ *japonicus.* Bleeker (= *S. asotus*). Java (one of types).
Chaca lophioides. Cuv. and Val. Debrooghur, Assam.

Plotosus canius. H. B. Calcutta.
„ *arab.* Forsk. Madras.
Clarias Teysmanni. Bleeker. Java.
„ *magur.* H. B. Calcutta.
„ *assamensis.* Day. Assam.
Saccobranchus fossilis. Bl. Do.
Silundia Sykesii. Day. Kurnool.
„ *Gangetica.* H. B. Orissa.
Ailia coila. H. B. Delhi.
Ailiicthys punctata. Day. Delhi.
Eutropiichthys vacha. H. B. Orissa.
Amblyceps mangois. H. B. Kangra.
Sisor rhabdophorus. H. B. Delhi.
Gagata cenia. H. B. (series). Calcutta.
„ *itchkeea.* Sykes. Poona.
Nangra Buchanani. Day. Indus.
„ *punctatu.* Do. Sone River.
„ *virideścens.* H. B. Allahabad.
Bagarius Yarrellii. Sykes. Deccan and Calcutta.
Glyptosternum lonah. Sykes. Poona.
„ *conirostre.* Steind. Kangra.
„ *telchitta.* H. B. Sone River, Bengal.
„ *madraspatanum.* Day. Bowany, Madras.
„ *platypogon.* Cuv. and Val. Java (Bleeker's Coll.).
„ *pectinopterum.* McClell. Simla (as *G. modestum*), Himalayas.
Glyptosternum cavia. H. B. Jumna.
Euglyphtosternum lineatum. Day. Suddya, Assam.
Pseudecheneis sulcatus. McCell. Darjeeling.
Exostoma Andersonii. Do. Bhamo, China.
„ *Blythii.* Do. Darjeeling.
Saurus Indicus. Day. Madras.
„ *myops.* Bl. Schn. Do.
„ *varius.* Lacép. Amboina.
Saurida tumbil. Bl. Madras.
„ *nebulosa.* Cuv. and Val.
Harpodon nehereus. H. B. Madras.
Scopelus Indicus. Day.
Belone melanostigma. Cuv. and Val.
„ *annulata.* Do.

Belone choram. Forsk. Bombay.
„ *leiurus.* Bleeker.
„ *cancila.* H. B. Madras (Variety). Hurdwar.
„ *strongylurus.* V. Hass. Bombay.
Hemiramphus longirostris. Cuv. (Bleeker's Coll.).
„ *leucopterus.* Cuv. and Val.
„ *cantori.* Bleeker. Madras.
„ *commersonii.* Do. Batavia.
„ *xanthopterus.* Cuv. and Val. Malabar.
„ *gaimardi.* Batavia (Bleeker's Coll.).
„ *unifasciatus.* Ranzani. Andamans.
„ *marginatus.* Batavia (Bleeker's Coll.).
„ *Reynaldi.* Cuv. and Val.
„ *Dussumieri.* Batavia (Bleeker's Collection).
„ *Georgii.* Cuv. and Val.
„ *far.* Forsk. Batavia (Bleeker's Collection).
„ *limbatus.* Cuv. and Val. Coromandel Coast.
„ *Buffonis.* Do. Andamans.
„ *ectunctio.* H. B. Calc. and Batavia (one of types of *H. amblyurus,* Bleeker).
„ *dispar.* Cuv. and Val. Andamans.
„ *brachynopterus.* Bleeker. Batavia.
Exocœtus micropterus. Cuv. and Val. Do.
„ *poecilopterus.* Do. Do.
„ *evolans.* Linn. Andamans.
„ *furcatus.* Mitchell.
„ *Bahiensis.* Ranz.
„ *mento.* Cuv. and Val. Madras, Malay Archipel.
Cyprinodon dispar. Rüpp. Male and Female. Kutch.
Haplochilus melastigma. McClell. Madras.
„ *rubrostigma.* Jerdon. Do.
„ *lineatus.* Cuv. and Val. Do.
„ *panchax.* H. B. Andamans.
Homaloptera Brucei. Gray and Hardw. Bowany.
„ *maculata.* Do. Wynaad.
„ *bilineata.* Blyth. Tenasserim.
„ *gymnogaster.* Bleeker. Sumatra.
Psilorhynchus balitora. H. B. Assam.
Discognathus lamta. Do. Madras, Salt Range.

Discognathus Jerdoni. Day. Bowany.
„ *modestus.* Do. Assam.
Oreinus sinuatus. Heckel. Simla.
„ *Richardsonii.* Gray and Hardw. Himalayas.
„ *plagiostomus.* Heckel. Suddya, Assam.
Schizopygopsis stoliczkæ. Steind.
Schizothorax progastus. McClell. Suddya.
„ *esocinus.* Heckel.
Ptycobarbus conirostris. Steind.
Diptychus maculatus. Do. Nepaul.
Labeo nandina. H. B. Assam (Variety, *macronotus*, Burma).
„ *fimbriatus.* Bloch. Orissa.
„ *nigrescens.* Day. Mangolore.
„ *calbasu.* H. B. Ghowatty.
„ *stoliczkæ.* Steind. Burma.
„ *gonius.* H. B. Calcutta, Bengal.
„ *Dussumieri.* Cuv. and Val. Trichoor.
„ *rohita.* H. B. Gowatty.
„ *porcellus.* Heckel. Poona.
„ *potail.* Sykes.
„ *kontius.* Jerdon. Bowany, Madras.
„ *ceeruleus.* Day. Sind.
„ *diplostomus.* Heckel. Simla.
„ *dyocheilus.* McClell. Debrooghur.
„ *pangusia.* H. B. Assam.
„ *angra.* H. B. Mandalay.
„ *bata.* H. B. Patna, Assam.
„ *microphthalmus.* Day. Himalayas.
„ *boggut.* Sykes. Calcutta.
„ *boga.* McClell. Madras.
„ *nukta.* Sykes. Poona.
„ *nigripinnis.* Day. Sind.
„ *sindensis.* Do. Do.
„ *ariza.* H. B. Madras.
„ *kaurus.* Sykes. Poona.
„ *bovianus.* Bowany.
Osteocheilus chalybeatus. Cuv. and Val. Burma.
„ *neilli.* Day. Burma.
„ *cephalus.* Cuv. and Val.

Osteocheilus melanopleurus. Bleeker. Sumatra.
Dangila Burmanica. Day. Moulmein.
Cirrhina cirrhosa. Bloch.
„ *Leschenaultii.* Cuv. and Val. Madras.
„ *mrigala.* H. B. Calcutta.
„ *latia.* Do. Simla.
„ *reba.* Do. Assam.
„ *fulungee.* Sykes. Deccan.
Semiplotus modestus. Day. Akyab.
„ *McClellandi.* Bleeker. Suddya, Assam.
Scaphiodon Watsoni. Day. Sind.
„ *irregularis.* Do. Do.
„ *Thomassi.* Do. Canara.
„ *brevidorsalis.* Do. Bowany, Madras.
Carassius auratus. Linn. Yunnan, China.
Catla Buchanani. Cuv. and Val. Calcutta.
Thynnichthys sandkhol. Sykes. Godavery.
Amblypharyngodon Atkinsonii. Blyth. Prome.
„ *mola.* H. B. Upper Assam, Calcutta.
„ *microlepis.* Bleeker. Orissa.
„ *melettinus.* Cuv. and Val. Cochin.
Barbus chagunio. H. B. (var. *spilopterus*). Assam.
„ *sarana.* H. B. S. Canara, Assam.
„ *dubius.* Day. Bowany, Madras.
„ *micropogon.* Cuv. and Val. Do.
„ *chilinoides.* McClell. Simla.
„ *carnaticus.* Jerdon. Bowany, Madras.
„ *hexagonolepis.* McClell. Assam.
„ *Dukai.* Day. Darjeeling.
„ *tor.* H. B. Assam (Variety). S. Canara.
„ *hexasticus.* McClell. Jumna.
„ *Bovianus.* Day. Bowany, Madras.
„ *sophore.* H. B. Khasia Hills.
„ *Curmuca.* Buch. Canara.
„ *lithopidos.* Day. Do.
„ *tambroides.* Bleeker. Sumatra.
„ *tambra.* Cuv. and Val. Do.
„ *Dobsoni.* Day. Poona.
„ *Jerdoni.* Do. Canara.

Barbus Wynaadensis. Day. Vithry, Wynaad.
„ *Neillii.* Do. Deccan.
„ *Malabaricus.* Jerdon. Malabar and Madras.
„ *melanampyx.* Day. Wynaad.
„ *macrolepidotus.* Cuv. and Val. Tavoy.
„ *chola.* Ham. Buch. Madras.
„ *parrah.* Day. Kurriavanoor.
„ *Burmanicus.* Do. Pegu.
„ *tetrapugus.* McClell. Hurdwar.
„ *dorsalis.* Jerdon. Madras.
„ *kolus.* Sykes. Deccan.
„ *Denisonii.* Day. Travancore Hills.
„ *melanostigma.* Do. Wynaad.
„ *arenatus.* Do. Madras.
„ *amphibius.* Cuv. and Val. Calicut, Jubbulpore.
„ *arulius.* Jerdon. Wynaad.
„ *mahecola.* Cuv. and Val. S. Canara.
„ *apogon.* Do. Bassein.
„ *ambassis.* Day. Madras.
„ *conchonius.* H. B. Lahore, Allahabad.
„ *ticto.* H. B. Ganjam.
„ *stoliczkanus.* Day. Moulmein.
„ *punctatus.* Do. Kurriavanoor.
„ *gelius.* H. B. (Series). Suddya.
„ *phutunio.* Do. (Series). Assam.
„ *stigma.* Cuv. and Val. Punjab, Madras.
„ *chrysopterus.* McClell. Hurdwar.
„ *terio.* H. B. Punjab.
„ *Punjaubensis.* Day. Sind.
„ *unimaculatus.* Blyth (Type of Blyth's). Sitang River.
„ *Waageni.* Day. Salt Range.
„ *cosuatis.* H. B. Calcutta.
„ *vittatus.* Day. Madras.
„ *filamentosus.* Cuv. and Val. Madras.
Nuria daurica. H. B. (Var. *alta* Pegu. Var. *malabarica*). Malabar.
Rasbora elanga. Do. Bengal.
„ *daniconius.* Do. Ootacamund.
„ *Buchanani.* Bleeker. Calcutta. Darjeeling.
Aspidoparia morar. H. B. Roorkee.

Aspidoparia jaya. H. B. N. W. Provinces.
Tinca vulgaris. Cuvier. Ootacamund.
Rohtee Bakeri. Day. Cottayam.
„ *cotio.* H. B. Assam.
„ (variety) *alfediana.* Cuv. and Val. Orissa.
„ *vigorsii.* Sykes. Deccan.
„ *Belangeri.* Cuv. and Val. Prome.
„ *Ogilbii.* Sykes. Madras.
Barilius vagra. H. B. Kangra and Simla.
„ *modestus.* Day. Punjab.
„ *schacra.* H. B. Assam.
„ *bendelisis.* Do. (Series). Assam and Madras
„ *barila.* Do. Delhi.
„ *Bakeri.* Day. Travancore Hills.
„ *gatensis.* Cuv. and Val. Wynaad.
„ *Canarensis.* Jerdon. Canara.
„ *barna.* H. B. Orissa, Assam.
„ *guttatus.* Day. Prome.
„ *tileo.* H. B. Assam.
„ *Evezardi.* Day. Poona.
„ *bola.* H. B. Assam.
„ *interruptus.* Day. Hotha, Yunnan.
Danio devario. H. B. Hurdwar.
„ *spinosus.* Day. Burma.
„ *malabaricus.* Jerdon. Malabar, Shevaroy Hills.
„ *æquipinnatus.* McClell. Darjeeling.
„ *dangila.* H. B. Assam.
„ *Neilgherrensis.* Day. Ootacamund.
„ *rerio.* H. B. Orissa.
„ *albolineata.* Blyth. Moulmein (Blyth Type). Burma.
„ *nigrofasciatus.* Day. Pegu.
Perilampus laubuca. H. B. Assam (var. *fulvescens*). Moulmein.
Chela gora. H. B. Orissa and Sind.
„ *Sladoni.* Day. Prome.
„ *sardinella.* Cuv. and Val. Bassein.
„ *untrahi.* Day. Mahanuddi and Madras Rivers.
„ *argentea.* Do. Bowany.
„ *Punjaubensis.* Do. Lahore.
„ *phulo.* H. B. Deccan.

Chela boopis. Day. Canara.
„ *clupeoides.* Bloch. Madras.
„ *bacaila.* H. B. Assam.
Botia dario. Do. Sone River.
„ *geto.* Do. Jumna.
„ *almorhæ.* Gray. Almorrha.
„ *Berdmorei.* Blyth. Burma (one of Blyth's Types).
Acanthopsis choirorhynchus. Bleeker. Prome.
Somileptes gongota. H. B. Bheer bohm.
Lepidocephalichthys guntea. Do. (Series). Kushtea, Calcutta, Bheerbohm.
thermalis. Cuv. and Val. Madras and Shevaroy Hills.
Berdmorei. Blyth. Moulmein.
Misgurnus anguillicaudatus. Cantor. Ponsee, Yunnan.
Acanthophthalmus pangia. H. B. Mandalay.
Apua fusca. Blyth. Pegu (one of the types).
Nemachilichthys Rüppelli. Day. Poona.
Nemacheilus rabidipinnis. Blyth. Tenasserim (one of the types).
„ *aureus.* Day. Hurdwar.
„ *scatarugina.* Assam.
„ *botia.* H. B. Saharunpore.
„ *urophthalma.* Günther. Godavery.
„ *pulchellus.* Day. Bowany, Madras.
„ *Guentheri.* Do. Neilgherries.
„ *semiarmatus.* Do. Bowany.
„ *corica.* H. B. Hurdwar.
„ *rupicola.* McClell. Simla.
„ *montanus.* Do. Simla.
„ *striatus.* Day. Wynaad.
„ *multifasciatus.* Do. Darjeeling.
„ *Denisonii.* Do. Malabar.
„ *notostigma.* Bleeker. Ceylon.
„ *zonatus.* McClell. Allahabad.
„ *triangularis.* Day. Travancore.
„ *Beavani.* Günther. Bowany.
„ *spilopterus.* Cuv. and Val. Cashmere.
„ *marmoratus.* Heckel. Cashmere.
Engraulis Hamiltonii. Gray. Burma.

Engraulis malabaricus. Bloch. Sind.
„ *mystax.* Bl. Schn. Madras.
„ *kammalensis.* Bleeker. Orissa.
„ *boelama.* Forsk. Amboina.
„ *telara.* H. B. Mandalay.
„ *purava.* Do. Madras.
„ *Commersonianus.* Lacép. Do.
„ *Indicus.* V. Hass. Orissa.
„ *tri.* Bleeker. Madras.
Coilia ramcarati. H. B. Calcutta.
„ *Dussumieri.* Cuv. and Val. Orissa.
„ *Borneensis.* Bleeker. Rangoon.
Chatoessus chacunda. H. B. Malabar.
„ *modestus.* Day. Burma.
„ *manminna.* H. B. Orissa.
„ *nasus.* Bloch. Madras.
Clupea longiceps. Cuv. and Val. Canara.
„ *fimbriata.* Do. Madras.
„ *Sindensis.* Day. Bombay.
„ *lile.* Cuv. and Val. Orissa.
„ *argyrotœnia.* Bleeker (Type from Bleeker's Coll.). Batavia.
„ *variegata.* Day. Bassein.
„ *chapra.* H. B. Orissa.
„ *ilisha.* Do. Sunderbunds.
„ *kanagurta.* Bleeker. Orissa.
„ *toli.* Cuv. and Val. Bombay.
„ *venenosa.* Do. Sind.
Pellona filigera. Do. Bombay.
„ *elongata.* Bennett. Madras.
„ *motius.* H. B. Ganjam.
„ *ditchooa.* Madras.
„ *megaloptera.* Swains. Madras.
Opisthopterus tartoor. Cuv. Madras, (
Raconda Russelliana. Gray. Orissa.
Dussumieria Hasseltii. Bleeker. Madı
„ *acuta.* Cuv. and Val. Ca
Spratelloides malabaricus. Day. Malabar.
Megalops cyprinoides. Brouss. Madras.
Chanos salmoneus. Bl. Schn. Canara.

Chirocentrus dorab. Forsk. Madras.
Notopterus kapirat. Lacép. Assam.
„ *chitala.* H. B. Bengal.
Monopterus Javanensis. Lacép. Batavia and Burma.
Anguilla bicolor. McClell. Madras.
Congromuræna anago. Tem. and Schleg. Andamans.
Uroconger lepturus. Richards. Madras.
Murœnesox cinereus. Forsk. Calcutta.
Ophichthys boro. H. B.
„ *microcephalus.* Day. Madras.
„ *colubrinus.* Boddaert. Andamans and Amboina.
„ *Orientalis.* McClell. Orissa.
Moringua raitaborua. H. B. Calcutta.
Muræna tile. Do. Andamans.
„ *sathete.* Do. Do.
„ *tessellata.* Richards. Do.
„ *fimbriata.* Bennett. Malay Archipel.
„ *pseudothyrsoidea.* Bleeker. Sind.
„ *undulata.* Lacép. Andamans.
„ *picta.* Ahl. Do.
„ *nebulosa.* Do. Batavia and Malay Archipel.
Gymnomuræna marmorata. Lacép. Andamans.
Syngnathus serratus. Schleg. Madras.
„ *intermedius.* Kaup. Do.
„ *spicifer.* Rüpp. Do.
Gastrotokeus biaculeatus. Bloch. Andamans and Malay Archipel.
Acentronura gracillima. Tem. and Schleg. Andamans.
Triacanthus brevirostris. Do. Madras.
„ *strigilifer.* Cantor. Do.
Balistes stellatus. Bl. Schn. Do.
„ *maculatus.* Gm. Linn. Do.
„ *vidua.* Richards. Malay Archipel.
„ *viridescens.* Bl. Schn. Andamans.
„ *undulatus.* Mungo Park. Malay Archipel.
„ *verrucosus.* Bl. Schn. Do.
Monacanthus choirocephalus. Bleeker. Madras.
„ *tormentosus.* Linn. Malay Archipel.
Ostracion turritus. Forsk. Madras.
„ *cubicus.* Linn. Malay Archipel.

Ostracion cyanurus. Rüpp. Suez.
„ *solorensis.* Bleeker. Malay Archipel.
Xenopterus naritus. Richards. Rangoon.
Tetrodon inermis. Tem. Schleg. Madras.
„ *lunaris.* Bl. Schn. Do.
„ *sceleratus.* Gm. Linn. Malay Archipel.
„ *hypselogenion.* Bleeker. Madras.
„ *oblongus.* Bloch. Andamans.
„ *patoca.* H. B. Madras.
„ *cutcutia.* Do. Ganjam.
„ *immaculatus.* Bl. Schn. Madras.
„ *reticularis.* Do. Malay Archipel.
„ *leopardus.* Day. Madras.
„ *fluviatilis.* H. B. Malay Archipel. and Calcutta.
„ *papua.* Bleeker. Malay Archipel.
„ *erythrotœnia.* Do. Do.
Diodon hystrix. Linn. Do.
„ *maculatus.* Lacép. Do.
Trygon kuhlii. Müll. and Hl. Do.

DIVISION XXVII.

BOWDEN, WILLIAM, 5, Kenway Road, Earl's Court, London, S.W.

542 (504) Samples of Prawn Chutney (from Madras).

543 (505) Mustard Oil used in making Fish Curries.

544 (506) Samples of Indian Chutneys, Pickles, Curry Powders, etc.

545 (507) Samples of Ingredients used in making Curry Powders (from Madras).

546 (508) Poppadums (cakes eaten with curries).

INMAN, A., Oriental Depôt, 17, Ebury Street, S.W.

548 (509) Curry Powders, Prepared Bummaloe Fish or Bombay Duck, Chutneys, etc., etc.

ADDENDA.

SINCE the Exhibition was opened, Dr. Bidie, C.I.E., of the Madras Central Museum, has sent the following live fishes:—Walking-fish, *Ophiocephalus striatus*; Butterfly-fish, *Trichogaster fasciatus*; Climbing-perch, *Anabas scandens*; Barbel, *Barbus punctatus*; and some others. All were brought in safety in the S.S. "Dacca," under the care of Mr. Kerr the chief officer, and they are now in the Zoological Gardens, Regent's Park.

Page 90. The Exhibits of Gnapee, Nos. 323 and 323(*a*), are made by Henry Buckle, Esq., of the British Burma Commission.

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